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ILLUSTRATIONS.

Design for Proposed Church, Teddington.—Mr. Ernest C. Lee, Architect 198-199
Warehouses, Rochester-street, Westminster.—Messrs. Isaacs & Florence, Architects 202-203
Norwich Regimental Depot Barracks.—Drawn by Mr. J. Mechelen Rogers, Architect 206-207
A Village Coffee-Tavern, Temperance Hotel, Hall, &c.—Mr. George J. Skipper, Architect 210
Two Houses, Twickenham.—Mr. Thos. R. Richards, Architect 211

CONTENTS.

Architectural Notes in Kent 187
The Indian and Colonial Exhibition: Models of Irr'gation and other Public Works 188
Notes 189
Letter from Paris 191
Proposed Extension of the Metropolitan Railway 192
Sussex Domestic Architecture 192
National Association of Master Builders 193
Lych Gate, Great Bourton, Oxon. (Illustrated) 193
The British Archæological Association 193
Railway Extension in the Colonies 195
Competitions 195
Sussex Archæological Society 195
The Proposed Hospital for Small-pox Patients 195
The Last of the Old Treasury House at the Tower (Illustrated) 196
Design for Proposed New Church, Teddington 196
Warehouses, Rochester-street, Westminster 196
Norwich Regimental Depôt Barracks 196
A Village Coffee Tavern, &c. 196
Two Houses, Twickenham 196
The Bickersteth Memorial Hall, Hampstead (Illustrated) 213
Berkshire Archæological and Architectural Society 213
Yorkshire Archæological Association 214
Bristol and Gloucestershire Archæological Society 214
Somerset Archæological Society 215
Superintending Architect, Metropolitan Board of Works 215
Pressure in Water Pipes 215
Provincial News 215
Church Building News 217
Dissenting Church-Building News 217
Stained Glass 217
The Student's Column: Stone Quarries.—VI. 218
Recent Patents 219
Recent Sales of Property 219
Miscellanea 220
Prices Current of Building Materials 221

Architectural Notes in Kent.

THE forthcoming excursion of the Architectural Association, which takes place next week, promises to be of great interest. The places to be visited include the ancient city of Rochester, with its cathedral, its castle, unrivalled in spacious massiveness, and several interesting houses of Elizabeth's time; Maidstone, with a fine church and an ancient archiepiscopal palace; Cobham Hall, a stately Elizabethan mansion, with a splendid collection of pictures; Leeds Castle, a stronghold dating from Edward I.'s time, but bearing on its face the marks of many subsequent periods; Penshurst, the home of the Sidneys, and for a few months in the possession of Sir Philip, one of the most brilliant ornaments of a brilliant age; and Ightham Mote, perhaps the most charming house in Kent. These are the chief items in the bill of fare; but they will be interspersed with the smaller courses of village churches, manor houses, and picturesque cottages, to be seen under the additionally exhilarating influence of beautiful scenery.

At Rochester, the centre of attraction some years ago would have been the cathedral; but now, who will venture to predict the smothered expressions of impatience if the *cicerone* be diffuse in his exposition of the notable features of Gundulf's work?—for Gundulf flourished in 1077, and was necessarily ignorant both of the beauties and enormities of five centuries later. Fashion will change, and the purities alone permitted to the excursionists some ten years ago are not quite so eagerly studied now. The strange food then rigidly forbidden is now welcomed, and speedily assimilated, and presently transmuted,—perhaps to a fine Principal's Residence in Oxford, or to new Law Courts at Birmingham. Of such food Rochester can offer a few dishes. There is Restoration House, so called because that excellent monarch, Charles II., stayed there on his progress towards London when returning to his inheritance in 1660; and Eastgate House, a picturesque old place, hard on the High-street, with roomy bay-windows, and panelled rooms, elaborate ceilings, and a handsome chimney-piece. The date 1591 occurs on one of the panelled beams. Then nearly opposite Eastgate House is a good street-front of Elizabeth's time, renovated in 1846, apparently, though the natives prefer to regard the figures (which are fancifully arranged) as representing 1684. The High-street contains several other interesting buildings, one of which, the old Corn Exchange, proffers a large gilt clock to the gaze of the passer by. As this dates from 1706 no doubt it will find its way into one or two sketch-books.

The High-street finally reaches the bridge leading to Strood, and near it stands the modern version of the "Crown," the inn where Elizabeth stayed, and where we may well suppose the company to have lodged who were afterwards set upon by Falstaff and his companions at Gadshill. The "new chimney" which then served the flea-bitten carrier as his clock (when he could see the position of Charles's wain in reference to it), together with the rest of the house, said to have been picturesque, has entirely disappeared and made way for the modern building. The excursionists will cross the bridge and pass through Strood on their way to the next place on the programme, Cobham Hall.

At Cobham we have the home of a valiant and enterprising race, who helped to make history in their day, and who were the dominating lords of that part of the country. The Cobhams took a leading part in most affairs of the neighbourhood from the time of John to the end of the fourteenth century, when the only representative left was a girl, heiress of vast estates, and by turns the wife of five husbands. The only daughter of the heiress became herself an heiress, and endowed with her estates her husband, Sir Thomas Brooke, of Somerset. For nearly two centuries the estates remained in the family of Brooke, lords of Cobham, until Henry, Lord Cobham, was attainted in the first year of James I., when they passed to the Crown, and were granted a few years later to a kinsman of the king's, Ludovic Stuart, Duke of Lennox. The last Duke of Richmond and Lennox left a sister, through whose grand-daughter the estates finally passed to the Earl of Darnley, and in this family they still remain.

Of the first and most famous Cobhams no architectural traces are left. The mansion is chiefly the work of Sir William Brooke, Lord Cobham, who succeeded to the estates in 1558 and died in 1597. The initials of himself and his second wife, Frances, daughter of Sir John Newton, Knight, are still to be seen on the spout-heads on the south side of the court:—W. F. C. 1587. On the north side the heads bear the initials W. C., a lion, and the date 1595. The porch on the south side is dated 1584, and that on the north 1594. All these dates fall within the time of William, Lord Cobham, who, as above stated, died in 1597. To him succeeded his son Henry, to whose time the chimney-piece in the gallery, dated 1599, and the ceiling in Queen Elizabeth's room, also dated 1599, both belong. But Henry's continuance in the estates was of short duration, for in 1603 he was attainted, and, though his life was spared, he fell into great poverty and died miserably in 1619. His father had been a high favourite with Queen Elizabeth. He entertained her nobly on one of her progresses. He was Lord Warden of the Cinque Ports, Constable of Dover Castle, Lord Lieutenant of the County, a Privy Councillor, Lord Chamberlain, and Knight of the Order of the Garter. The unfortunate Henry himself began life under happy auspices, but those times craved wary walking, and before he had enjoyed his patrimony seven years he found himself cast out and a stranger presently installed.

The building itself is not the only record remaining of its erection, as the following interesting particulars, kindly furnished by Lady Darnley, show:—

"State Papers (Domestic), *temp.* Elizabeth, vol. 283, No. 64.

Endorsed '1601'; written by R. Williams, from Cobham Hall, to Henry Brooke, the last Lord Cobham.

Particuler of buildings thought necessarie to be done this yeare at yr Lo. house at Cobham, together wth an estimate of the charges thereof, as well as for materialls to be bought as for the workmanshipp of the same:—

1. First, the building of the foureth turrett, according to the modell agreed upon by yo^{r} Lo. alreadie.

2. The making of the staire and half paces of stoane.

3. A newe doore case to be made and set up in the newe parlor.

4. The flooring of the same parlour wth deal boordes.

5. The plastering of the same parlour over hed with suche kinde of work as it shall please yo^{r} Lo. to sett doune.

6. The plastering of the great staier overhed.

7. A dore to be made at the hed of the staier, into the olde buildings of brick or timber.

8. Joyners work to be doen in the great chamber and the Lodging adjoining to the Queenes chamber.

9. The covering of 3 turrets wth led.

Provisions to be made for the same works.

Ledd to be bought v foder dimi (?)	xl^{li}
Lyme xxv loades	xij^{li}
Irone & glasse	c^{s}
For Lathe	c^{s}
For Tiles	c^{s}

The charges of the half paces, step, and dore case over and above the money alreadie dispursed xxx^{li}.

Sum^{ma}, iiij^{xx}xiij^{li} [that is, fourscore and thirteen pounds].

Workmen's wages.

The wages of 2 Carpinters for 6 months, at lx^{s} per moneth	xviij^{li}
The wages of 4 Joyners for the same time	xxxvj^{li}
The wages of 2 Bricklaiers for the same time, at lx^{s} per moneth	xviij^{li}
The labourers' wages for the same time	xiiij^{li}

Masons' wages, by estimate	vj^{li}
The plumbers' wages	vj^{li}
The plasterers' work by estimate	xv or xx^{li}
For prigges nailes flooring and other extraordinary charges	x^{li}

Sum^{ma} cxxviij^{li}.

Sum^{ma} totalis ccvxj^{li}.

Yo^{r} Lo. must resolve what and how much you are pleased to have doen by Giles de Whitt, either upon some new chimneypiece, or upon my Lo. yo^{r} father's tombe, that the poore man have some worcke to get wherewithall to maintaine and susteyne himself."

Extract from a previous letter written by R. Williams to Lord Cobham in State Papers (Domestic), Elizabeth, vol. 279, No. 94 :—

"March 30, 1601.—We have bargained with Giles de Whitt for making two chimneypieces for the two chambers next to your new Chapel. He demands 65*l.* for both. I will not give above 50*l.*, and he will accept it in the end rather than fail."

Poor Giles de Whitt ! his price beaten down from 65*l.* to 50*l.*, yet "he will accept it in the end rather than fail." No record is left of the sum his lordship finally gave, but if, rather than fail, Giles would do the work for 50*l.*, it is to be feared his lordship made the best bargain he could. He did not then expect to feel the pinch of poverty himself so soon.

There are two wings of the original structure of the Cobhams left ; the part which connects them was built by the last Duke of Richmond and Lennox in 1662, as the date on the building testifies, and is the work of Inigo Jones. In it, in addition to the Gilt Hall, are two fine ceilings by Adams. But the interior has been much modernised, and little of the original work is left, except a ceiling or two and a few chimney-pieces, which, however, do not include the two for which Giles de Whitt was beaten down. The chief interest of the interior lies in the magnificent collection of pictures, which rivals that seen last year by the excursionists at Wroxton Abbey. The general effect of the house outside is fine and stately. The north side of the north wing is perhaps as picturesque as any, including one of the four turrets mentioned by R. Williams. But a close inspection tends to damp one's enthusiasm, since most of the windows, both in the bays and the plain wall, are but counterfeit presentments. Some of them, no doubt, have been built up since their erection, for the greater comfort of the rooms and the avoidance of the window tax ; but many of them must have been shams from the outset.

Considerable repairs and restorations were undertaken at the end of last century and extended over a period of thirty years, but they seem to have been done with much judgment, and the whole effect of the exterior is very little impaired.

Across the park lies the pretty village of Cobham, where the church contains a magnificent series of brasses extending from 1320 to 1529, as well as a coloured altar-tomb of Sir George Brooke, Lord Cobham, the father of the Sir William who built the house. In the village are also the remains of the old college or chantry founded by one of the last of the first race of Cobhams, and the picturesque new college or almshouses founded by the same Lord Cobham who built the house.

THE INDIAN AND COLONIAL EXHIBITION.

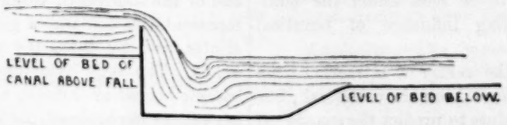
MODELS OF IRRIGATION AND OTHER PUBLIC WORKS.

IT is much to be regretted that the same pains and skill which have rendered the Indian Courts such a brilliant success have not been bestowed on that portion of the Exhibition devoted to an exposition of the public works of India. The same people whose handiwork testifies to their having advanced so far in arts and manufactures, whether regard be had to beauty in design or perfectness in execution, have also proved themselves equally capable projectors and constructors of works of public utility. In boldness and grandeur of conception, as well as in skill of workmanship, the engineering works of the ancient rulers of India will certainly bear favourable comparison with, if they do not actually surpass, those of any other nation during the age in which they were constructed. The scale on which their operations were carried out dwarfs the works of former generations even amongst European nations, for it is not until the present century that the rapid progress of civilisation has created a demand for gigantic enterprises amongst Western nations and the stupendous structures connected with them. It is, therefore, much to be deplored that there should be almost a total absence of information regarding the native public works of India. Beyond a model of the Grand Anicut (weir) across the river Cauvery, in the Tanjore district, and one showing the system of tank or reservoir irrigation, there is little or nothing from which can be gathered what the ancient rulers of India accomplished. We searched in vain for a model of one of the many great reservoirs in the Madras Presidency, whose areas are represented by square miles, and whose capacities are measured not by gallons, but by hundreds of millions of cubic yards, whose embankments vary from 50 ft. to 100 ft. in height, and whose masonry outlets are of the most solid description, constructed with the finest ashlar, and which, after the lapse of centuries, are still in the highest state of preservation. Models of such works as have stood the test of ages so well, though they may not have been the outcome of scientific calculation, are, nevertheless, not without their degree of instructiveness, and are certainly invested with the greatest interest. It would have been much to the purpose had the Indian Government sent home sections of some of the most important reservoir embankments, with working models of the waste-weirs and masonry outlets, together with particulars of the dimensions and capacity of the reservoirs and the areas irrigated by them.

The models which have been selected, and which are exhibited in the Administrative Court, consist, for the most part, of individual structures connected with the irrigation projects more recently constructed by the British Government ; but even these have been chosen only in a haphazard sort of way, and arranged in an equally random manner, without any attempt at classification, and unaccompanied by any intelligible explanation. Seeing the importance justly attached to irrigation works in India, and the absolute dependence of a great portion of that country upon them for its very existence, it might have been expected that special attention would have been devoted to elucidating this branch of the exhibits, so as to illustrate clearly the different systems adopted to meet the differing conditions encountered in the various provinces of the Empire. As, however, this has not been done, it is difficult to convey to those not conversant with India an idea of the great series of works, detached portions of which only are represented either in the models or photographs.

The best model showing the arrangement of a river weir and its attendant head works for supplying a system of irrigating channels, is that of the Lower Coleroon Anicut, in the district of Tanjore, situated some fifty miles below the bifurcation of the rivers Cauvery and Coleroon. The dam is built in two bays, each 1,500 ft. long. In its centre are sets of scouring sluices, for the purpose of preventing an accumulation of sand on the upper side of the weir. The design is a clear vertical fall on to an ashlar apron, which is protected by a long talus of large rubble stone. The main canals are led off from either flank. To have made this work intelligible generally there should have been a model of the whole Delta, showing the manner in which the main canals and distributaries are led over the country. Close by this model there is another on an enlarged scale of the "Grand Anicut," which is a very ancient structure. It was constructed for the purpose of maintaining the water in the river Cauvery, which runs on a high level, and preventing its escape into the low-level river, the Coleroon, and, at the same time, to act as a waste-weir for the superabundant water brought down in high floods, which had formerly made a clean breach through the narrow neck of land that separates the two rivers a few miles below their bifurcation, and which used to inundate large tracts at the lower end of the Delta. Since the British Government took the Cauvery irrigation in hand, all the works comprised in the system have been gradually improved, and the floods brought under complete control ; but the main design is still the same as originally projected by the native rulers, and remains a monument of their intelligence and skill. The great importance of the Cauvery system may be gathered from the fact that the crops of over 800,000 acres are dependent entirely upon its canals.

The next series of river works represented is that of the Sirhind Canal, supplied by the River Sutlej, and is the largest as regards dimensions of any canal yet constructed in India. The model shows the arrangement of the river dam and head works as a whole, with enlarged details of the sluices. The weir itself is a vertical wall, 8 ft. in height, surmounted with movable shutters, 2½ ft. high, and is protected by a long talus of rubble stone. The Sirhind system is of a different type to the Deltaic series of South India. The whole of the water required for the irrigable area, amounting to 800,000 acres, instead of being taken off from the head by two or more main canals, is all passed through a single regulating bridge, which is a grand structure, comprising thirteen large arches, divided into thirty-nine smaller ones, in which the gates are fitted and worked by a travelling winch. The canal, with its branches, measures 550 miles, and irrigates a hitherto very neglected tract of country. In connexion with this model is another, illustrating one of the locks, and an ingenious arrangement for the adjacent fall or canal weir. The water is passed from the upper to the lower reach through notches so designed as to maintain the water above the fall at its normal depth in all stages of supply. In passing over semicircular lips in front of the notches the falling water assumes a V-shape, and attains a wide even distribution before it reaches the basin below, which is made wide and deep, and of a form which keeps the floor intact and prevents any harm to the adjacent slopes of the canal.



The next model deserving notice is that of the dam and head works for supplying the Baree Doab Canal. The conditions in this case differ from those on the Sutlej, inasmuch as the weir is built high up in the boulder region where the River Ravee has a fall of 30 ft. per mile, and where consequently when in flood it is a raging torrent rolling huge boulders along its bed as though they were marbles. Accordingly, a different alignment of the dam and a different arrangement of details were rendered necessary. Instead of being built perpendicularly to the axis of the stream, it is carried obliquely to it. Great precautions had to be taken for preserving the piers of the sluices and regulating bridge from the action of the boulders, and special arrangements had to be made for working the gates according as the floods rose or subsided. These details have not, however, been shown in the model. The river dam is 2,445 ft. long, from 3 ft. to 6 ft. high above the original bed, and the regulating bridge across the head of the canal consists of twenty-three arches, each 10 ft. wide. The irrigable area is 654,000 acres, about half of which has up to this time been actually irrigated.

This canal was designed upon the model of the great Ganges Canal, which is the type of what is known in Upper India as "doab" irrigation, *doab* signifying a tract of country lying

between two rivers whose beds run in a deep trough considerably below the level of the adjacent country.

The model showing a section of the longest weir in the world, in one unbroken wall of masonry, 2½ miles in length,—that across the River Sone, a tributary of the Ganges,—had it been perfectly rendered would be one of the most interesting of those exhibited; but as it stands, it conveys no idea of what the great work really is. A small model of a portion of the dam sluices is given in detail, but on too small a scale. It would have been much more useful had a working model,—say one-half, or even one-fourth, of the full size,—been so arranged with a head of water against it, as to show the actual mode of lowering the gates on a rising flood. The gates, which are 9 ft. high and 10 ft. wide, are stayed up by rods working in a cylinder against a water cushion. A small hole bored in the cylinder allows of the gradual escape of the water when the gates are forced back after being released by a lever actuated from the shore end; and thus, instead of being suddenly and violently thrown down by the pressure of water on the upper side, the gates fall gradually and gently on the floor of the sluices. Placed as the model is, merely upon a table and without any means of testing its operation, the value of the design is completely lost. It is in reality a most ingenious though simple mechanical contrivance.

There are also models of detached structures connected with the Godavery and Kistna delta works, but they convey no idea of the magnitude of those splendid irrigation schemes, nor are there any plans, maps, or descriptions from which any information regarding them can be gathered. The Orissa series and the Ganges Canal are also unrepresented, beyond some photographs of various isolated portions. There is, however, a good model of a large irrigation well, showing the arrangements for raising and distributing the water. The well is surmounted by an octagonal structure fitted for four bullock runs, and corresponding sets of basins and outlets from which the raised water is discharged into the field channels. It is, however, incomplete without the cattle and the apparatus by which the water is raised. There are also some good models of timber slides showing how felled timber is conveyed from the forest to the river, down which it is afterwards floated. The old method adopted in Madras for sinking brick cylinders for foundations in sandy and treacherous soils is also illustrated by a good model. That method has now been superseded by the use of the various excavators which were introduced by the late Mr. C. Fouracres and other engineers. As a specimen of native handicraft, the model of a carriage used on the Oude and Rohilkund Railway is likewise interesting, as well as that of the track boat used on the Godavery and Kistna Canal, and a canal dredger designed by Mr. Fouracres.

On the whole, this portion of the Exhibition, which might and should have been made one of the most useful and instructive, as well as interesting, comes decidedly short in every way. It is the more to be regretted, as since famines in India, with their attendant horrors, have of late years been brought so prominently before the English public, it was all the more incumbent that they should have been better and more fully instructed as to the kind of works by which those famines can alone be mitigated, if not altogether prevented.

Surrey Archæological Society. — The annual excursion of this society took place on Wednesday in last week, when Guildford was selected as the place of meeting. About a hundred ladies and gentlemen took part in the meeting, and the whole arrangements were carried out with much care and ability by the assiduous honorary secretary of the society (Mr. Thomas Milbourn) and Mr. Ivatt. After visiting the Grammar School, the members listened to a paper by Mr. D. M. Stevens, on "The Royal Grammar School; its Founders and History." Subsequently they proceeded to the Castle (where Mr. Ralph Nevill, F.S.A., acted as *cicerone*), Shalford Mill House, Tangley Manor House, Chilworth, and Tyting.

NOTES.

THERE still seems, according to Mr. Jeans's interesting paper read at the Exhibition Conference last week, a good field for the expansion of the railway system in our colonies, the figures showing an average of one mile to every 7,379 of the population and every 269 miles of area, while in the United Kingdom there is one mile of railway to every 6½ miles of area, and in the United States one mile to every 25 miles of area. Still, when we take into consideration the scantily settled nature of the various colonies, and the sparseness of the population, the comparison is by no means so much to their disadvantage as appears at first sight. The results of the colonial railways are not so encouraging as they might be, for, with the exception of India, Queensland, and New South Wales, which all pay at least 4 per cent., they are not particularly remunerative regarded as investments. Canadian railways only pay on an average 1·4 per cent.; Victoria (Australia), 2·91; New Zealand, 2·51; and the Cape 2·65,—and this, too, although freight rates are higher than in England, with the exception of India and Canada, where they are lower. On the other hand, the development of traffic on a colonial railway is somewhat of an unknown quantity, and sometimes sets in with great rapidity when least expected; and it occasionally happens that a net traffic of less than 300*l.* a mile will yield a dividend of over 4 per cent., whereas in England it requires 1,700*l.* per mile to produce the same. In any case, the extension of railways is a necessity to the colonies, whose varied produce must be brought to market; and it becomes, therefore, less a question for the capitalist than for the prosperity of the country.

WE understand that the Board of Works are much disappointed with the response to their advertisement for a Superintending Architect, and may probably advertise again,—a report which seems to be confirmed by the fact that the *agenda* paper for this week's meeting contains (as mentioned in another column) a recommendation that Mr. Vulliamy should be formally retained in office for another quarter. Meantime, Mr. Hebb, who has for ten years acted very ably as Mr. Vulliamy's second in command, has sent in his own statement of his claims to consideration for the vacant post, which are certainly greater than those of any of the present list of applicants. Mr. Hebb has the advantage of having been for a long time personally conversant with the work of the Architect's Department of the Board; he has had a great deal of practical experience; and he is also a man of architectural and artistic taste and of general culture. The Board may, if they advertise again with somewhat different conditions, obtain the ideal "strong man" whom they want; but, as matters at present stand, it would really be unsuitable to place any one of the candidates who have applied over Mr. Hebb's head, as his superior officer. Mr. Hebb is, according to his own statement, one year older than the limit of age prescribed in the Board's advertisement, and therefore was formally precluded from responding to it; but hard-and-fast lines as to age are rather misleading in such cases. Some men are fit for more work at fifty-five than others at forty-five.

THE world has lately been running to buy the latest editions of evening papers with as much eagerness as if every man in the street were a possible Home Secretary. The only appointment, however, in the new Government with which we are concerned is that of Mr. Plunket, as First Commissioner of Works. This gentleman is almost an unknown quantity in this office, for though he filled it during the last Conservative Government, his tenure of office was too short to enable a judgment to be formed on his capabilities as First Commissioner. Of more importance was one of the last acts of the late Government, viz., the appointment of Mr. Gladstone's first Private Secretary, Mr. Primrose, to succeed Mr. Mitford as Secretary to the Board of Works. A really larger amount of power is in the hands of this permanent official than in those of the Parliamentary representative of the office. Capacity as a private secretary is no test of capacity as head of such an office as this. But both Mr. Plunket and Mr. Primrose are far from being bureaucrats, and they are more likely to listen carefully and to heed attentively really authoritative opinions on London buildings and improvements than were the previous holders of these two offices.

WE are indebted to Lord Rosebery, the Foreign Secretary of the late Government, for a movement calculated to be of considerable value to the commercial community. It consists in a re-arrangement of the publications known as Consular Commercial Reports, which hitherto have been brought out and put together in such a manner as to neutralise their undoubted utility. By the time that the routine of the department has allowed public access to the reports, the information is so old that its value is greatly decreased and it is only retrospectively useful. Lord Rosebery has, however, arranged for the immediate issue of what may be called the current commercial intelligence, leaving the residuum of statistical and geographical matter to be completed later on. It is to be hoped that these cheap and handy little blue books will become a real vade-mecum for merchants, instead of finding their usual destination in the butterman's basket.

UP to the 30th of June, 1885, according to the report just made by M. de Lesseps, the sum of 19,834,480*l.* had been expended on the Panama Canal, about 1,000,000*l.* of which, however, had not been paid on that day. The "constituted capital" of the company, it should be remembered, is 12,000,000*l.*; and the "rectified estimate" of the cost of the works, made by M. de Lesseps, in September, 1880, was 21,200,000*l.* On the 30th of June, 1885, according to the figures now furnished, the excavation performed amounted to about 14,000,000 cubic mètres; the total excavation of the Canal, originally estimated at 46,000,000, being now estimated at 110,000,000 of cubic mètres. On these figures, 93 per cent. of the estimated capital had been expended, and rather less than 8 per cent. of the work had been performed, at the end of June, 1885. The resources created, the report states, including the share capital, and the three series of obligations already issued, amount to 28,524,176*l.* This, however, speaks of cash actually received. The sum for which the Company is responsible already is 36,647,740*l.*, the difference consisting mainly in the rebate or discount at which the obligations were issued. This sum will be raised by the new loan, if effected, to 60,524,176*l.*, or nearly three times M. de Lesseps's "rectified estimate" of 1880. However, the annual meeting of the Canal Company, on the 29th of July, accepted the report of M. de Lesseps without hesitation.

ALTHOUGH few counties are more profusely supplied with railways than Yorkshire, room is being found for another in the shape of the Scarborough, Bridlington, and West Riding Junction. By its first section, from Scarborough to Driffield, a direct communication will be afforded to Hull, instead of the present rather circuitous route by Flamborough Head; and by the second, from Driffield to Market Weighton, the Selby and South of England traffic will go *vid* Bridlington and Filey, instead of being taken round by Hull in one direction, or by York in the other. The three East coast watering-places will all benefit by the more direct access, while a great impetus will be given to the Filey fisheries; and the making of the new railway may perhaps revive the oft-mooted scheme of constructing a harbour of refuge at the latter port. Anyhow, the southern section will open up to the tourist a bit of country not so well known as it deserves,—a wold district rich in early remains and modern restorations. Goodmanham, a village near Market Weighton,

through which the line will pass, is associated with the first appearance of Christianity in these islands, the church having been built on the site of the Pagan temple, which was under the official care of Coifi, high priest of Odin. Convinced, however, by the arguments of the missionary Paulinus, he broke in pieces the idol, and was baptised in company with King Edwin, while the Saxon temple was succeeded by a Christian fane. The "Sir Tatton Sykes" country between this and Driffield is wild, but full of interest to the ecclesiologist and the architectural sketcher.

IT may, perhaps, be an open question whether urban communities should not be the proprietors of the gas lighting of the streets and houses. Artificial light being necessary, the community ought to supply themselves. To do this is to work on the broadest and truest principles of co-operation. Most persons will be of this opinion when they observe that the Gas Light and Coke Company, which supplies a great space of London with gas, have just declared a dividend of twelve per cent., and carried an enormous balance over to the next half-year. The cheapness and excellence of mineral oils has somewhat diminished the consumption of gas in many houses, but it seems in no way to have affected the profits of the gas companies. But any one who takes the trouble to read the report of the Company to which we have referred, as published in the daily papers, will certainly inquire of himself why the metropolis does not, like some provincial towns, supply itself with gas, and not put such huge profits into the pockets of comparatively a few shareholders.

A DECISION of some importance as to the meaning of the term "tenantable repair" was given by the Court of Appeal last week. The landlord contended that by that term was meant decorative repair, in other words that the tenant was to paper and paint the house. On the other hand, the tenant urged that it was only necessary that he should keep the house in a state of structural repair, and the Court decided that the contention of the latter was correct. At the same time they declined to say what the exact meaning of these words was. An ordinary tenant from year to year not under lease must keep the premises wind and water tight, but need not do more than this. "Good repair" has been held to mean "habitable repair," but one naturally asks what does "habitable repair" mean? In fact, it would not be easy to say what is meant by these vague expressions, and the advice which may fairly be given both to landlords and tenants is to say explicitly and in detail what the tenant's obligations are. The use of such expressions as these generally arises because neither landlord nor tenant is quite at one as to their intentions, and by employing some vague phrase, each side hopes ultimately to get the better of the other.

WE print in another column an extract from the *Lancet*, entitled "Drink in the Building Trade." While quite agreeing with our contemporary as to the need of habits of sobriety and steadiness being observed by all engaged in building operations,—especially in these days of girder-work and mechanical appliances,—and while commending and endorsing the suggestion that master builders might, perhaps, do more than they do at present in encouraging the provision of water and other non-intoxicating thirst-slakers, we feel it incumbent upon us to protest against the implication that workmen in the building trades are more prone to "slip out for a drink at the nearest public-house" than workmen in other trades. Indeed, on all well-regulated "jobs," the workmen are sufficiently under the surveillance of foreman and timekeeper to render this "slipping-out for a drink" not very easy; but at stated intervals (whether too often or not we will not undertake to say) the potboy from a neighbouring tavern comes on to the works with a can of beer, which we trust (for the sake of those who consume it) is always unsophisticated.

APART altogether from the political aspects of the question, the union between Great Britain and Ireland would probably be cemented more firmly than ever by the formation of the projected submarine tunnel between Donaghadee, in Co. Down, and Portpatrick, on the opposite Scottish coast. We learn that Mr. Douglas, the engineer to the Irish Board of Lights, has been engaged for some time past in taking soundings, with a view of ascertaining whether any geological difficulty stands in the way of the work, while shafts of a thousand feet in depth are to be sunk at each place, to ascertain the measures. Should it prove feasible, Government may well be asked to advance the undertaking with substantial help; for it would be one that, physically speaking, would not be so formidable as the Channel Tunnel, while the political side of the question would be greatly benefited by a union of so palpable a nature.

THE transformation of Rome is the subject of an article in a recent number of the *Saturday Review*, and is a point with which we are very much inclined to agree. There must be few visitors to Rome nowadays who can help seeing that a vast change is coming over that most wonderful of cities, and that the modern builder is showing a great deal too much activity there. Although it is our province as well as our pleasure to advance in every possible way the art of building, there are places which it is the truest appreciation to leave alone as much as possible. The Eternal City is one of these, and we cannot but regret the sad havoc that Hausmannism is making of the time-honoured remains and associations. To the speculative builders of the present day, we might apply the words of the once popular French song, "Rien n'est sacré pour un sapeur," so ruthlessly does he regard the remains of the past, when he is once fairly embarked on the war-path of a building "boom." There is something singularly jarring with all the canons of good taste when we read of the Quirinal being covered with the buildings of a brand-new quarter, and with boulevards that may vie in height and breadth with those of Paris and Vienna. The semi-circuit that the Civita Vecchia Railway makes round the outer walls presents a sad panorama of reckless demolition and scandalous reconstructions. Here is a venerable ruin cut clean in two, the gaping windows and severed arches yawning pitifully in the sunshine, while the walls, strong and solid as ever they were, are tottering to the strokes of the pickaxe. Another side of the question is, that for residential purposes Rome is becoming less and less desirable on the score of expense, the price of land reaching an artificial value, and rents being increased to match. There is, however, an archæological set-off to this rather gloomy picture, and that is the discovery of many antiques of the highest interest, which, but for the excavator's pickaxe, would have remained unknown.

THE sale by auction of Staple Inn, Holborn (lately purchased by Messrs. Geo. Trollope & Sons, and, it is said, for 80,000*l.*), is announced to be held in next October. The transfer will not, apparently, include the block of buildings No. 11 and its adjoining messuage, or the terrace: No. 12, and the Land Registry, southwards of the garden court. This range has been taken over by her Majesty's Government as an addition to the Patent Office in Southampton-buildings, with which it will be thrown into communication. Though Staple Inn, with its hall of *circa* 1630 (*teste* Sir George Buc), escaped from the Great Fire, all the existing chambers, excepting the northern sets, Nos. 4–6, with their quite unique front towards Holborn, are of later date. They have been rebuilt at various periods between 1699 (No. 11), and 1759 (Nos. 2 and 3). The Holborn elevation seems to have been in danger from fire in the middle of last century, for the neighbouring chambers, No. 1, were erected after a conflagration in 1757. In that same year, too, was set up the unworthy and ridiculous portal over the hall garden door, one Thomas Leach being then Principal of the Ancients. The terrace was built in 1843, from the designs of Messrs. Wigg & Pownall, and is a very successful example of its style. Lovers of Charles Dickens's novels will be sorry to learn that the homes of Mr. Grewgious (at No. 10, first floor), of Pip, and Mr. Tartar, together with the rooms that Crisparkle engaged for Landless, will probably share the fate of the pretty little garden whither Mr. Snagsby would seek solace in retreat from his turbulent quarters in Cook's (rightly Took's) court hard by. Hither Dr. Johnson removed on March 23, 1759, from Gray's Inn, and here he wrote "Rasselas," wherewith to defray his mother's debts and the several charges that arose upon her death at Lichfield. But the imminent demolition of the Holborn frontage is to be regretted on other grounds, since it constitutes the best-preserved relic of late sixteenth century Domestic architecture that the City can now show. It was until recent years almost entirely obscured by Middle-row, and now offers a fine prospect as approached from the newly-widened Gray's Inn-road.

SIGNOR GIACOMO BONI has recently reprinted, from the *Archivio Veneto*, the result of a survey made by him of the column and bronze lion on the Piazzetta at Venice, on the 1st of June last. It appears that the iron framework supporting the lion has suffered from rust and exposure to the air, and Signor Boni suggests that this framework, which is extremely heavy, should be replaced by a framing of bronze of simpler construction. The lead covering of the abacus of the capital of the column is in a bad state, the joints of the sheets having given way in places. The abacus itself, which is in three beds subdivided into various pieces, is broken in places, the injury having been occasioned by the defective setting of the stones. The capital is broken into three pieces, and the cracks, which were pointed some twenty years ago, are beginning to re-open. The shaft of the column is of grey Egyptian granite. In 1863, when the inclination of the column was noted, it was feared that the dilapidation, which was then observed, would continue to progress, but it is now understood that the condition of the column is due to a fire which occurred in the year 1756.

IT is stated that the Receiver for the Metropolitan Police District has purchased the site on the Embankment known as the Opera House site for the erection of new Central Police Offices. It is an admirable site for the purpose, and we trust that the building to be erected upon it will be worthy of its position. To be so it must be something very far superior, in architectural character, to the ordinary run of Metropolitan Police Office buildings.

ALL who know the City Architect will be gratified to hear of the official honour which has been conferred on Sir Horace Jones, as we are now to have the pleasure of styling him; and the members of the architectural profession generally may be glad to know that it was "for his distinguished services to the City of London as Architect to the Corporation" that the honour of knighthood was conferred upon him, and not for merely ceremonial reasons.

WE have repeatedly urged the completion of St. George's Hall at Liverpool, by sculpturing the panels which were intended to be sculptured, without which the building is only half completed. One of these panels has, at last, been executed by Mr. Stirling Lee, who was to have made a series of panels illustrating the progress of Justice, at the very modest price of 150*l.* per panel. It appears, however, from a report of the proceedings in the Liverpool Town Council on Wednesday last, that the project is likely to be knocked on the head after all. The Council on that occasion, by a majority of twenty-nine against three, refused to vote the money for the second panel. As far as we can gather, the reason for this is that the majority of the Town Council are utterly unable to understand the meaning of

ideal sculpture, to begin with; that they have not the least idea of the abilities of the sculptor they have been employing; and that some of them regard the employment of sculpture in the decoration of one of the finest modern buildings in England as "a downright waste of public money." Mr. Rathbone, who had apparently most to do with the selection of the sculptor and the subject, has some whims about art with which we do not sympathise, but he knows what good work is, and he is not wrong in his estimate of Mr. Stirling Lee, who, however, we should imagine would hardly care to have anything more to do with the Liverpool Corporation as art patrons. Municipal council-chambers are not generally the arenas, it must be admitted, of very intellectual art-criticism; but anything more hopelessly stupid and vulgar than the remarks which formed the staple of the debate on the St. George's Hall sculpture, and the jokes (?) about the nude figures, as reported in the Liverpool papers, we never had the misfortune to read.

FROM some recent correspondence that has been published it appears that the Vicar of Stratford-on-Avon is indignant at the backwardness of his parishioners and of the public generally to subscribe to his proposed alterations in the way of taking down galleries and removing existing seats, and twits the public at large with an indifference to the memory of Shakspeare on this account. It appears to us that the memory of Shakspeare has about as little as possible to do with the matter. If the Vicar were applying for help to preserve the tomb of Shakspeare, or any other relic of the poet, from decay or desecration, we could understand his tone; but that we are to subscribe to make alterations in the seating of the church to suit the Vicar's fancies, because Shakspeare is buried there, seems a piece of truly clerical logic.

THE *Calcutta Englishman* gives an edifying extract from the report of Mr. A. C. L. Carlleyle, "First Assistant, Archæological Survey," giving the writer's account of his own artistic prowess in exhuming an ancient statue of Buddha, putting it together again (all very well so far), and supplying the missing portions by additions in Portland cement, which he was "so fortunate" as to obtain from a district engineer, who, says the Indian paper, "it is to be hoped did not know the use which it was to be put to." Engineers in general are not over-sensitive on such matters, and would probably think Portland cement a very good material to repair Buddha with; but something better might have been expected from a member of an "archæological survey," and the spectacle of a "first assistant" adding value to an ancient statue by modelling up the missing portions in Portland cement with his own hands is, indeed, one of those things the contemplation of which renders life so sad and bewildering a problem.

THE irrepressible *Times* art correspondent is at it again. He writes from Venice now, where again he seems to have picked up an architect to "coach" him. The description of the state of the foundations of St. Mark's, the cathedral "slowly sinking into the mud of the lagoons," is but too true; but the statement that the new mosaic work has been done so admirably in accordance with the spirit of the old, that the "correspondent" could not tell which was old and which was new, is likely to provoke a cynical smile in some quarters. That he could not tell ancient mosaic from modern is likely enough; but what does that prove?

The Street Memorial, Royal Courts of Justice.—An admirable piece of wrought-iron railing from the design of Mr. A. W. Blomfield has just been placed in front of the statue in the central hall at the Royal Courts of Justice. It has been manufactured by Messrs. Thomas Potter & Sons, of Oxford-street, who made the whole of the metal work for this building.

LETTER FROM PARIS.

AN end has at length been put to many delays and evasions on the part of the Government by the appointment of three General Directors for the Exhibition of 1889. The first and most important post falls of right to M. Alphand, who is at the head of everything connected with the architecture and building of the Exhibition,—its planting, lighting, and sanitary arrangements, besides directing all fêtes and public ceremonies, and examining and deciding upon all estimates, contracts, special charges, &c. M. Georges Berger, General Managing Director, will superintend the transport department, both in the French and foreign sections, the classifying of groups and sections, the allotment of space, the arrangement of exhibits, the appointment of juries, the prizes, &c. M. Grisons will fill the less brilliant, but not less important and difficult post of General Director of the Financial Department of the Exhibition. Above these three hovers the Minister of Commerce. M. Lockroy, in appropriating to himself the lion's share of control, appears to forget how frequent political reverses are in France, and that the fortunes of a Minister are precarious, and dependent upon sudden and unforeseen crises in the political world.

The strongest impression made by the whole affair is that of the inflexible determination of M. Alphand in the midst of every sort of opposition and uncertainty. Even the other day at the Municipal Council a fraction of "irreconcilables" exerted themselves to find flaws in the architectural and engineering works of the Director, but with no other result than the calling forth of a speech sparkling with wit and humour, in which M. Alphand referred to his irreproachable past public life and services extending over fifty years. Come what may, the success of the Exhibition depends entirely upon him, and even should it fail, his fame is sufficiently established by what he has already done for the improvement of Paris.

There seems to be no doubt as to the cordial relations at present existing between the Minister of Commerce and the three directors, who are to have a large latitude accorded to them in their respective departments.

M. Alphand has been commissioned to prepare preliminary plans of the Exhibition buildings, utilising the most salient points in the designs of MM. Dutert, Eiffel, and Formigé, and the following general arrangements are already adopted in principle:—The machinery department will occupy the end of the building on the side of the École Militaire. In front, opposite the Trocadéro, will be erected the much-talked-of tower, 300 mètres in height, surrounded by galleries devoted to an exhibition of works of art. Between this tower, which we maintain to be inappropriate, and the machinery gallery, there will extend two enormous halls, to contain the national and foreign sections of the Exhibition. The open space between these halls will be converted into an ornamental garden by M. Alphand, who is commissioned to prepare a report on the whole scheme with the least possible delay. The grouping of the various classes of industries will differ very little from that of the Exhibition of 1878. It behoves all concerned to bestir themselves in order that the opening of the Exhibition on the 1st May, 1889, may not take place in the midst of a confusion of unpacked cases and unfinished arrangements.

It is impossible to conceive all the interests and ambitions that are stirred by this project. The very title, "Exhibition of the Centenary of the Revolution," gives rise to all sorts of intrigues. One of these is an attempt to get up a Museum of the Revolution which will provide excellent sinecures for a favoured few, and extort absurd prices for autographs and curiosities dating from the revolutionary epoch, and of no actual value whatever. This attempt is all the more absurd since a Museum of the Revolution exists already at the Hôtel Carnavalet, and contains collections of real interest and value, both historical and artistic. The same may be said of the uncalled-for monument to the French Revolution which the Municipal Council propose to erect in front of the Tuileries. The Minister of Fine Arts has refused the site, which he destines to another purpose. Hence great indignation at the Hôtel de Ville, and probable interference on the part of the Deputies for the Seine. It is unnecessary to add that M. Charles Garnier, architect of the Tuileries, can hold his own against all encroachments, political or otherwise. But we must not trench on delicate ground.

Quitting the dangerous subject of politics, let us turn to the School of Art, where the annual examination and award of the "Prix de Rome" have just taken place. With regard to architecture, the students who had to deal with the restoration of the Court of Exchequer have produced a number of very interesting schemes, some of which give evidence of considerable artistic feeling. We would draw particular attention to the imposing façade which gained for M. Depasse (a pupil of M. André) the first prize, and the clever designs which brought M. Louvet and M. Sortais the second and third prizes respectively. The first prize for painting has been awarded to M. Lebayle, pupil of MM. Cabanel and Aimé Millet. The subject given was "Claudius proclaimed Emperor by his Soldiers." The second prize fell to M. Alexandre Lavallée, pupil of MM. Cabanel and Théodore Maillot. M. Sinibaldi obtained the third prize. He also studied under M. Cabanel, who, as will be seen, is everywhere victorious. To tell the truth, neither of these three compositions is animated by that spirit of power that points, even in the scholar, to exceptional genius. These "variations," played by clever pupils, are not worth very much. Nevertheless, in this kind of competition, if originality had any chance of finding favour in the eyes of the jurymen, the composition of M. Sinibaldi would certainly deserve it rather than either of the others. The sculpture competition strikes us as being far superior. The subject set was "Tobit drawing the Fish from the Water," and the successful competitor, M. Paul Capellaro, has shown himself a worthy follower of his father, the well-known sculptor. His composition (which leads us to hope much for his future) is, notwithstanding a little affectation, a decidedly decorative idea. In this competition the second prize was awarded to M. Larebe, and the third to M. Chavaillaud. Finally, the first prize for engraving was unanimously decreed to M. Patricot; and we would end our record of the recent work of the Académie des Beaux Arts by noting that the "Duc" prize was carried off by M. Chancel for his design for a public hall.

The past month has been rich in inaugurations of all kinds. July 14th was the occasion for these, and it would seem that the best way of pleasing the living is by celebrating the dead with much speechifying and singing of the "Marseillaise." Diderot has now his statue (of which we do not think very much) in the Place St. Germain des Prés. Rabelais has a bust (a poor work of Truphême) at Meudon; while that of Jean Jacques Rousseau ornaments,—one hardly sees why,—the town of Asnières. A statue of Lamartine has been unveiled at Passy in the shady *Place*, which now, in long-delayed homage, bears the name of the great poet. And, before long, the statue of Louis Blanc, cast in bronze after M. Delhomme's model, will be erected in the Place Monge.

On the other hand, however, the new post-office, which should have been opened on the 14th of July, will not be ready for use until the end of August. The Municipality has contented itself with the inauguration of a monument in the Cemetery of Mont Parnasse to the memory of those Gardiens de la Paix who died victims of duty. This memorial, executed after the design of M. Formigé, consists of a stone stele, severely simple in treatment, and with no decoration but the arms of Paris and a commemorative inscription.

With reference to M. Formigé, we should add that the crematory designed by this young architect is proceeding rapidly. In this it is intended to dispose of the human remains furnished by the dissecting-rooms of the hospitals, the only possible use for cremation while the law prohibits any but the usual method of burial.

The recent death of Mgr. Guibert, Archbishop of Paris, has brought forward the question of the Church of the Sacré Cœur, of which the venerable prelate was the founder and promoter. Here, according to his express wish, his remains are to be deposited as soon as M. Abadie's work is finished. It was even said that the interment would take place at once in the crypt, but allowance has to be made for political and popular feeling, and rather than create complications for the Governments, and to avoid even the risk of a refusal, the ecclesiastical authorities have temporarily deposited

he body of the Archbishop in the vaults of Notre Dame.

Not long ago certain organs of the extreme Left declared that a recent landslip at Montmartre was occasioned by the works going on at the Church of the Sacré Cœur. The city engineers, with M. Alphand at their head, easily proved that it was nothing of the sort, and that the subterranean works executed by Abadie, so far from endangering the hill, actually consolidated its loose and crumbling soil. On the other hand, no one is heard to complain of the real injury done to the steps of the Pantheon by the accumulation of flower-wreaths placed there at the funeral of Victor Hugo last year. The damp has worn away the stones, and filtered through the joints to the subterranean arches. It will be absolutely necessary to repair and in part to replace the steps, and the five or six thousand francs which this will cost must be added to the amount already spent on the "secularisation" of the Church of Ste. Geneviève.

Artistic news is so rare at this time of year that we are glad to have to record the excellent measure that M. Turquet, Under-Secretary of State for the Fine Arts, has just carried. It consists in the founding of a gallery for the accommodation of sketches of all works ordered or acquired by the State. It may be added that for a long time past the City of Paris has been forming a similar collection, which constitutes a complete history of Parisian art during the last five-and-twenty years.

We may also note the opening of a new hall devoted to the architectural remains of the South of France, and the erection at the Ministry of War of a grand "Salon d'Honneur," decorated with portraits of former Ministers of War, from Louis de Revol, Secretary of State for War under Henri III. in 1588, to our own day.

Two years ago, at the request of the General Council of the Seine, the Government removed two paintings, by M. Robert Fleury, from the Audience Chamber at the Board of Trade and placed them, together with Flandrin's portrait of Napoleon III., in the Gallery at Versailles. It was no doubt considered that the subjects, "Napoléon I. promulguant le Code de Commerce," and "Napoléon III. inaugurant le Tribunal," were too political in their nature. In order to fill the void thus created, M. Bailly, President of the Society of Artists, intends to propose to the Government to issue a Commission for two great historical pictures, the subject of the first being the "Nautes," or Parisian boatmen of the time of Lutetia; and that of the second, a Railway Station and arrival of merchandise in the nineteenth century. The contrast would be striking, and as there can be no possible objection on political grounds to the paintings, the proposition will probably be entertained, and the works entrusted to M. Tony R. Fleury.

In conclusion, we must express our regret at having received last week intelligence of the death of the engraver Maxime Lalanne, whose reputation was made many years ago, and who leaves a considerable store of works behind him. He was born at Bordeaux in 1827, and studied at Paris under M. Jean Gigoux. He made his *début* at the Salon in 1852, with some charcoal drawings, which attracted considerable attention. From this time till his death he continued to furnish illustrations to many important works, and to exhibit at the Salon. Among his greatest works may be mentioned twelve plates, representing Victor Hugo's residence in Guernsey, large views of Paris and Bordeaux, scenes of the war of 1870, and a great number of etchings after old masters, in particular a reproduction of the Bay of Weymouth after Constable. Maxime Lalanne was the author of two important treatises, — one on copper-plate engraving, an art of which he was a most accomplished master, and the other on charcoal drawing. He received medals as an engraver at the Salons of 1866, 1873, and 1874, and the Cross of the Legion of Honour in 1878.

Redbourn, Herts.—The east window of Redbourn Church has just been filled with Munich stained glass. The subject represented is the Ascension, and the window has been erected in memory of Mr. and Mrs. Wade by their children. The work was entrusted to Messrs. Mayer & Co.

PROPOSED EXTENSION OF THE METROPOLITAN RAILWAY.

It is somewhat of a truism to say that engineering considerations are of primary importance with reference to railway extensions; but, the fact is, that this principle does not appear always to have been grasped by railway directors and managers. A signal instance of its neglect is just brought before the public. The Metropolitan Railway is, as is well known, characterised by remarkable peculiarities. It has been constructed at the vast cost of some two-thirds of a million per mile, in order to carry an unequalled,—not to say an illimitable, —passenger traffic. In the last half-year it has transported 39½ millions of passengers, a number that shows the remarkable increase of four per cent. over the corresponding part of 1885. In order to accomplish this great task, everything is peculiar. The engines are constructed to attain the speed of forty-five miles an hour, starting and stopping as suddenly as is consistent with the safety of the passengers. Carriages and permanent way are specially constructed to meet this unusual condition of traffic. How admirably this has been done is illustrated by the fact that the Metropolitan Railway is, at the same time, the cheapest and the most costly line to work of any in the United Kingdom. The apparent contradiction may be thus explained:—If measured by the mechanical duty performed, that is to say, by weight transported over distance (without instituting any comparison with the Metropolitan District or the North London railways), the working expenses of the Metropolitan are between three and four times as much as on the average English railway. Measured, on the other hand, by percentage of receipts, they are the lowest in the country. It is clear that a machine of so delicate a nature as the railway requires to be managed in exact accordance with the principles on which it was constructed. And if any proof of so obvious a canon were required, it would be furnished by the extraordinary confusion into which the traffic was thrown by the opening of an additional link of the same system on the completion of the Inner Circle Railway.

That the case is eminently one in which well should be let alone is proved by the rate of increase above cited, which is nearly double that of the population accommodated by the line. At the same time, there is a material defect in the system, owing to the squabble with what is physically, and ought to be altogether, an integral part of the same system, viz., the Metropolitan District Railway. To weld into one these essential parts of the same scheme, and to foster and provide for the steady increase of so vast and lucrative a traffic, would be an ample occupation for an able and competent Board of Directors.

Instead of this, and in spite of the marked opposition of the shareholders present at the meeting of the 27th ult. (an opposition overborne by proxies in the hands of the directors), it is proposed by Sir E. Watkin to graft on to this self-contained system a branch of a totally different nature. From London to Rickmansworth and Chesham the country is of a character requiring but light works, light rails, light engines, and few trains, to carry a very light rural traffic. To run one of the 42-ton locomotives of the Metropolitan over this district would be, on engineering considerations, a reckless waste of money. To have a duplicate establishment, of engines and of carriages, for the two different systems, would also be an idle cost. Sir E. Watkin said, "If they did not make the railway the London and North-Western Company would." Is that any good reason for launching out into an enterprise so essentially dissimilar from the true function of the Metropolitan Railway? The whole system of suburban traffic is a subject of delicacy. The interconnexion of short and long trains has led to an enormous expense in the way of duplicating lines. The cost of interspersing traffic of different natures may be conceived from the fact that while the Great Western Railway employ 17·4 men per mile, the Metropolitan Railway employs 76·6 men per mile. The French lines employ 14·24; the Scottish, 12·95; and the Irish 6·88 men per mile. And while the servants of the Metropolitan Railway earn each 39*l.* per annum, for the employers, those of the French railways earn 20*l.*; of the Great Western, 20*l.*; of the Scottish lines, 20*l.*; of the London and North-Western 19*l.*; and of the Irish Railways, 16*l.* each in the year. These considerations, which might be extended to a much greater length, ought to be enough to warn the shareholders of the Metropolitan Railway of the probably mischievous results of the proposed incongruous extension of their line.

SUSSEX DOMESTIC ARCHITECTURE.

No county archæological society exhibits greater vitality than that of Sussex. It has been in existence no less than forty years, and during that period has done and said so much for the antiquities of Sussex that one might believe that nothing had been left undone or unsaid. Mr. André, however, has struck out a new line of research, and in pursuing it* has come across a good deal that is interesting, and, to a certain extent, novel. Castles, churches, mansions, and abbeys have been again and again described and surveyed, but the old farm-houses and the town dwellings of the richer tradesfolk have met with little attention at the hands of the county historian, while the humbler homes of the peasantry have served only as studies to the artist in search of the picturesque. But it is among these unpretentious buildings that Mr. André has found many examples of good old English work well worthy of attention.

Of course, in a county like Sussex, where, until modern times, wood was abundant, very little else than timber was used in the construction of secondary domestic buildings for many centuries. These "half-timber houses," as they are called, generally present the same features. There is a foundation of rough masonry, rising a few feet above the ground, and on this a sill of wood connecting the end standards or uprights which carry the tie-beams and wall-plates of the roof. The chamber-floor often projects, and, when this is the case throughout the building, the angle-posts usually exhibit some moulding or decoration. The spaces between the story-posts are sometimes formed of wattle and daub, and sometimes of brick, set flat or herring-bone fashion. In the Eastern Counties the panels thus formed are often marked with patterns on the surface, but instances of this "parget-work" are rare in Sussex. The chimney-stack is usually of brick or of masonry, solidly built in bold fashion, and carried up to a well-formed chimney-shaft, or cluster of shafts, in which the base, the shaft, and the cap are distinctly and carefully treated. Sussex chimneys, like Sussex fire-backs, have a high reputation for beauty, and Mr. André especially commends a specimen at Moor Farm, Petworth, "with two lofty shafts, having angle pilasters of an elegant design." He has also introduced drawings of chimneys at Horsham of bold character, and one from Thakeham, in which the series of brick stepped gables which cover the sloping of the stack is a pretty feature.

"Doors, both external and internal, were generally what are known as ledged ones; that is, composed of three or four horizontal pieces, covered with boards (instead of being framed in panels as in modern work). These 'claddings,' as they are termed, were often of two thicknesses, thus giving scope for mouldings on the stouter ones; at other times, the covering was of one thickness, the joints of the boards being concealed by fillets fixed on with large ornamental-headed screws or nails."

The difficulty of making a modern sash-window picturesque is great, but not insurmountable. Still, for pleasing effect, there is nothing equal to the old lead casements, divided by mullions of wood or stone, but extending pretty well across one side of the parlour or kitchen. Lead work admits of considerable artistic treatment, and examples are to be seen at Horsham and elsewhere of the metal pierced in patterns for the sake of ventilation. Mr. André draws attention to a plumber's shop-front in Chichester, which exhibits a leaden panel about 8 ft. long, bearing the date 1728, and enriched with figures of double-tailed mermaids and soldering-irons, &c., in saltire.

The general plan upon which the smaller houses were built was a parallelogram, having a middle portion devoted to the chimney corner in the centre of it, flanked on one side by the entrance-lobby, on the other by the stairs

* Sussex Domestic Architecture in its Humbler Aspects. By J. Lewis André, Esq. (Paper contributed to vol. xxxiv. of the "Sussex Archæological Collections.")

winding round the chimney, and closed in at the bottom by a door. The earliest staircase proper had massive carriages, to which solid triangular steps were affixed, and now and then, as at Tower Hill Farm, Horsham, the staircase rises in one flight from the centre of the hall and then branches off right and left to the chamber floor. As a rule, the flights were composed of a fewer number of steps, and more numerous landings than at present, and occasionally a low gate, or even a trap-door, closed the headway and forbade access to the chamber floor.

Sussex was so rich in oak that wood-carving was naturally a common pursuit, and specimens of considerable beauty are still to be found in farm-houses and even in cottages. The oldest panels are oblong in shape; and, though the linen-fold is a favourite pattern, yet the carver often made his own design and displayed a good deal of taste therein.

"Old panels in both wall panelling and furniture were fixed to the framing round them in a different manner to that employed at present, as they had the back surface sloped or feathered off at the edges and sunk in grooves in the frames; modern ones have a square sinking all round the edges, instead of the feathering." When a room was panelled, special ornamentation was bestowed upon the cornice, and at a farm in Warnham (where the building must always have been of the humblest class) there are good roll and battlement mouldings still existing in this position.

Metal-work was an industry native to Sussex two centuries ago, and it will be remembered that the iron railings around St. Paul's Cathedral were made in the county. Collectors of curiosities have made fire-backs and andirons comparatively scarce, but examples of both may still be seen in remote farm-houses, while hinges and locks of quaint design are by no means infrequent. Mr. André notices beautiful specimens of wrought-iron work in the pretty village of Lindfield,—one, the entrance-gate to a small house, which has a crest cleverly worked in amongst scroll-work and foliage; the other, the bracket supporting the sign of the "Tiger Inn." Indeed, in the immediate neighbourhood of the hammer-ponds there is little difficulty in discovering abundant evidence of what was in the seventeenth century the most flourishing Sussex manufacture.

We cannot do better than conclude our remarks upon Mr. André's interesting paper in his own words:—

"Nearly every article of furniture used by our ancestors was made more or less ornamental; even tradesmen's business desks and common boxes were covered with carving, the design being often only slightly sunk, as in the Scandinavian "chip carving." Our forefathers were also fond of placing pious mottoes on articles of domestic use, such as drinking-cups and the like. A skillet in Lewes Museum, for example, has on it, 'Fere God'; and it may be mentioned that 'God's Providence House' at Chester has its fellow in Sussex, as one at Ninfield bears the inscription,—'God's providence is mine inheritance. Except the Lord build the house, they labour in vain that build it. Here we have (1659) no abidence.'"

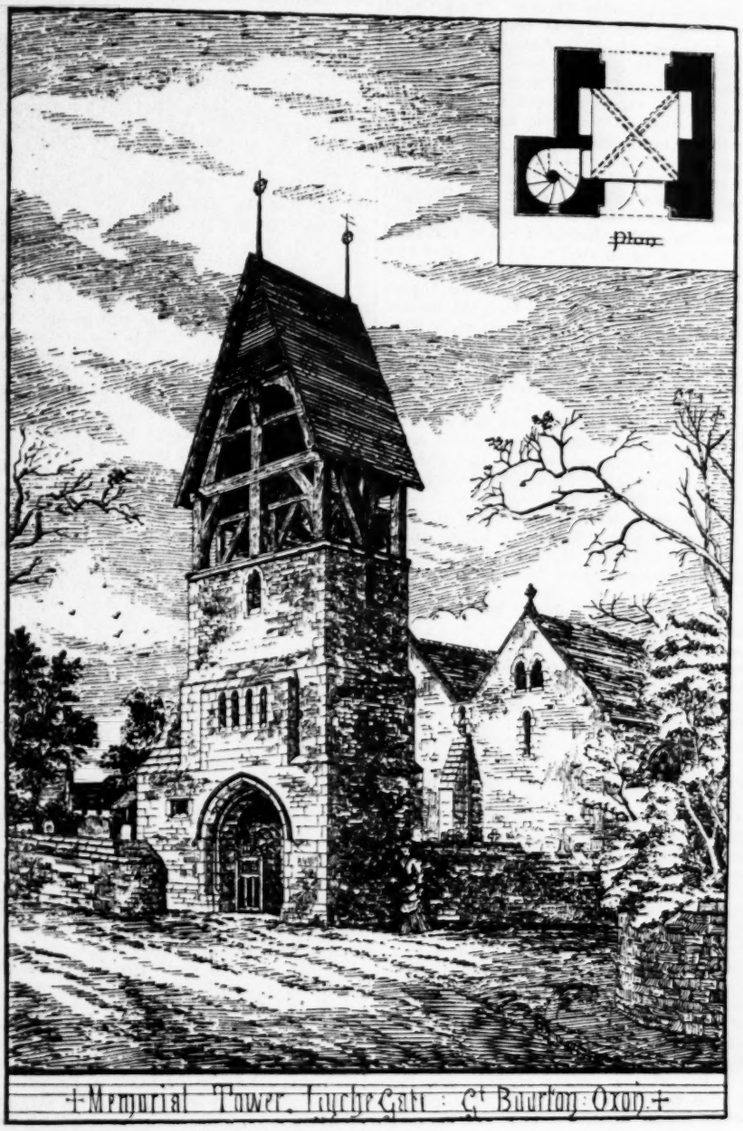
NATIONAL ASSOCIATION OF MASTER BUILDERS.

The half-yearly meeting of the National Association of Master Builders of Great Britain was held on the 27th ult., at the Red Lion Hotel, Cambridge, and was attended by representatives from London, Liverpool, Birmingham, Bristol, Hull, Bradford, Bolton, Lancaster, Northampton, Wigan, St. Helens, Cambridge, and Lincoln.

The meeting was presided over by Mr. W. H. Cowlin, of Bristol, the President of the Association, who reported to the meeting the evidence given before the Select Committee of the House of Commons upon the working of the Employers' Liability Act, 1880, and the proposed amendments, and also upon other matters of legislature affecting the building trade.

The report and accounts for the past half-year were read and adopted.

It was decided to hold the next half-yearly meeting at Nottingham.



TOWER LYCH GATE, GREAT BOURTON.

The Memorial Tower Lych Gate was designed for the Parish Church of All Saints, Great Bourton. It is built of local yellow sandstone, with Hornton stone dressings, and the work was carried out by Messrs. J. & T. Lambert, from the drawings of Mr. W. White, F.S.A., Wimpole-street, London.

THE BRITISH ARCHÆOLOGICAL ASSOCIATION.*

Thursday, July 29th.—The party proceeded by train to Bishop Auckland Station, whence carriages were in readiness to convey them to South Church, dedicated to St. Andrew, one of the two old churches of the town. The day being wet, the church proved to be a welcome shelter, all the more agreeable from the great number of interesting features contained within its walls. The building was described by Sir. J. Picton, the Rev. Dr. Hooppell, and Mr. Loftus Brock. It is of large size, having a long chancel, in which are still the stalls of the secular college founded here by Bishop Beck. The windows of the chancel are alternately lancets and insertions, of the end of the thirteenth century, having plain curved bars of stone instead of tracery, a feature which is not unfrequent in the Durham churches. There are transepts opening from the aisles, and not from the nave. The nave-arches are particularly good Early English work, very effectively moulded, as is also the south vaulted porch. The western tower is early thirteenth-century work, and, as at Staindrop, the original spire has disappeared, and a later belfry-story has been built in its place, having a square staircase turret. There are two very fine monuments, one of a knight in chain mail, carved in oak, and of a lady, with an elaborate head-dress, in stone. These monuments are now preserved in the tower. Much interest was taken in the very remarkable series of Saxon incised stones found during the restoration of the church, and now deposited in the north aisle. Some of these are of very great beauty, carved with figures and with foliage and birds so elaborately that the foliage would compare with some thirteenth-century work. The fragments consist, for the most part, of portions of the shafts of sepulchral crosses. A visit was then paid to the second church, St. Helen's, Auckland, which was described by the Rev. Dr. Hooppell. It is a small structure of Early English work for the most part, with some curiously-carved capitals.

The celebrated Saxon church at Escomb was next inspected, the unfavourable weather preventing more than a cursory view of the exterior. It consists of a nave, 43 ft. 6 in. by 14 ft. 4 in., and a chancel 10 ft. square. There is a porch on the south side of the same dimensions. The building is entirely built of squared stones, evidently taken from some Roman site, doubtless that of the station of Vinovia (Binchester) close at hand. These stones have not been reworked, but present the tool marks and broached patterns of the Roman masons. A stone inscribed with the title of the Sixth Legion exists on the north side, built up in the walling, and on the south side there is a piece of sculpture which has been made to do duty as a sundial, a feature which recent research shows was a usual one in Saxon churches. The

* See p. 157, *ante*.

walls and the openings "batter" to a perceptible degree. The chancel arch is high and narrow, being 13 ft. 10 in. from the floor to the crown, and only 5 ft. 3 in wide. It has well-defined "long and short" work to the jambs, and the semicircular arch appears to be a Roman arch re-erected. The flooring has been originally formed of a pitching of small stones, part of which is still visible. The font is a large trough, the step on which it stands being of masonry arranged in the form of a cross. Dr. Hooppell related the discovery of the building, which, although of such well-defined Saxon work, had escaped observation until only a few years ago. It was then in a very dilapidated condition, and had been superseded by a modern church erected on another site. In fact, the demolition of the building had been contemplated at an earlier period than the erection of the new church. The Rev. Prebendary Scarth and Mr. Roach Smith pointed out some of the features of the Roman walling stones, in which many curious evidences remain of their uses in former buildings, and Mr. Loftus Brock called attention to the side windows, which agree with two recently discovered at Staindrop Church. The latter, therefore, may be considered as being of the same early date. The building stands in the midst of the cottages of a mining village close to the banks of the Tees, and it has now been sufficiently repaired to be used for divine service.

The party, which had completely filled the little sanctuary, left with regret, and arrived somewhat late at Bishop Auckland Castle, which was visited on the invitation of the President of the Association, the Lord Bishop of Durham. Luncheon having been partaken of, the Bishop led the party through the various ancient portions of the large irregular building, describing the history of every part. Taking the guests into the Stable Court, he pointed out that the buildings were the last remains of the houses of the secular canons removed from St. Andrew's Church to serve the Collegiate Church here instead. These are on the south side of the present castle. The chapel at the opposite extremity was then inspected, and here the Bishop delivered an interesting address, pointing out from documentary evidences the reasons for believing that the original chapel was on the south side, and that it consisted of two stories. The present chapel, which was consecrated by Bishop Cousins in 1663, has a series of fine pointed arches of early thirteenth-century work, evidently a portion of an ancient building. The Bishop inquired if it could be the hall of the ancient castle? Mr. Brock replied that the analogy of other buildings would appear to show that it was, but that it required the existence of a range of kitchens and offices to the north-east of the chapel, where there are no buildings at present. The original chapel would certainly be close to the canons' houses instead of on the other side of the castle. The chapel is now a detached building, and it has a capital oak screen very similar to other work of Bishop Cousins's in Durham Cathedral.

Notwithstanding the rain, a large party proceeded to the site of the Roman station Vinovia, now Binchester, under the guidance of Dr. Hooppell, to inspect a part of the excavations made by Mr. Proud under Dr. Hooppell's direction. Some very important discoveries were then made, and the remains were afterwards filled in again. A fine hypocaust, in almost perfect condition, was re-opened and lighted up for the inspection of the visitors.

A meeting was held in the Reference Hall of the Darlington Free Library in the evening, when papers were read as follows:—"The Life of St. Wilfrid," by Mr. J. I'Anson; "On the Conyers Family of Sockburn," by Mr. Fred. R. Surtees; and "On the Works of the Nevill Family," by Mr. J. P. Pritchett,—the latter paper being illustrated by plans of Raby and Middleton castles.

Friday, July 30th.—The rain again interfered with the arrangements of the day, but the programme was adhered to. It included a visit to Richmond, Easby Abbey, and Catterick. On arriving at Richmond Station, a visit was paid to St. Mary's or the Low Church, a name derived in regard to its relative position to Trinity Chapel in the higher part of the town. Mr. Loftus Brock, F.S.A., described the architectural features of the building, the oldest part being of Early Norman work. There are two twelfth-century arches at the west end, four-teenth-century windows, and a good Perpendicular tower at the west end. The Early English features have suffered so materially in the restoration that whether or not the present are copies or otherwise of old work cannot now be determined by observation. The church stands on sloping ground, and it is a conspicuous feature in the view of the town. Proceeding up the hill, the chapel of the Holy Trinity was inspected. This is a free chapel, built originally by the Lords of Richmond Castle to meet the wants of the inhabitants who founded the town beneath the shelter of the castle walls. It consists of a nave, small chancel, and north aisle, with a western tower, all except the latter being over-restored. The building has suffered unusual degradation at the hands of a former generation, and the tower is now occupied as a dwelling. A house is built in the western part of the nave, and a range of shops has been formed beneath the north aisle. The south aisle is entirely ruined, and the party inspected a piscina on one side of a dust-bin. Mr. Brock quoted Leland with respect to the existence of ancient sculptures, and proceeded to point out fragments of what was probably an enriched Norman doorway, doubtless part of the sculptures referred to, built up on the north side of the nave.

The party next paid a visit to the grand old Castle of Richmond, which, by order of Major Dickenson, was thrown open for inspection, it being used as a military depôt. Mr. Brock briefly related the history, calling attention to the recorded erection of a castle here by Alan Rufus, 1071, the later erection of the lofty keep by Conan in 1146, and many items of the history. Notwithstanding its commanding situation and the usual nature of the means for its maintenance, it was proved to be dilapidated so early as the fifteenth year of Edward III., and in ruins in Leland's time. The walls enclosing the little area occupied by the town, first of earth and afterwards of stone, were more than once damaged during incursions of the Scots, and repaired; but the castle itself appears to have been left to the elements from the time named. Proceeding to a survey of the various parts, the towers were identified from an ancient survey made to determine the parties responsible for upholding the various parts under the knightly service of castle guard. The building was erected originally as a curtain wall, enclosing a large area, built along the edge of the precipice beneath which the river Swale flows, there being towers at intervals, and a banqueting-hall, called Scollard's Hall, with an external staircase, upheld by the Lords of Bedale. The core of the walls was shown to be of very early Norman work, while the keep, of later work, is of well-squared light sandstone. The keep is planned fairly in accordance with usual arrangements, and its analogy to other keeps of nearly the same date was pointed out. It differs in one material particular. There is a large arch opening from the open area on its inner face, the whole of the ground-floor being thus open to observation. This unusual arrangement was accounted for by the fact that the arch was older than the keep, and that it was, in fact, the original entrance. It is built in the earliest style of Norman work, with roughly-carved capitals of red stone.

The magnificent site of the castle was inspected, the party proceeding along the newly-constructed path around the base of the walls on the outside, overlooking the rocky bed of the Swale and its water-fall. The market-place being crossed, the party passed beneath the little postern still remaining in a portion of the old wall of the town, to the ruins of the Grey Friars' Church, a building founded in 1257 by Ralph FitzRandal, Lord of Middleton, whose heart was buried here in 1270. But feeble remains exist of the church, but there is evidence sufficient to show that it was a building of the fourteenth century, consisting of a chancel, nave, and wide southern aisle or transept, of which the eastern wall with two Decorated windows remains. A fine light lofty steeple of very late Perpendicular work is built between nave and chancel, within the side walls of both, thus curtailing the width. Mr. Brock adduced other instances of this both in England and Ireland, and showed that it was a usual arrangement. The new work being bonded into the old is sufficient to indicate that the rebuilding of the church, as has been stated, was not intended.

After luncheon a portion of the party proceeded to inspect some newly-discovered prehistoric remains in Whitecliffe woods. They found two or three circular chambers which have been recently excavated, formed of stone walling, with openings covered by large lintels.

Carriages then conveyed the party to Easby Church, which was described by Mr. J. P. Pritchett, the remarkable early thirteenth-century wall paintings being carefully inspected. They have deteriorated seriously during the recent years following their discovery, being now far less bright than when opened to view. There is an early Norman font, and a piece of still earlier Saxon shaft-work built into the arcade wall. Two fine thirteenth-century floriated crosses have been also built in as old material, without regard for their previous use, in the fifteenth-century wall of the south aisle.

The beautiful ruins of Easby Abbey, adjoining the church, on the banks of one of the most charming curves of the Swale, were then inspected, and Mr. Pritchett read a paper descriptive of the remains and their history, illustrating his remarks by a plan of the building. He afterwards led the party around the ruins. The carriages being resumed, a visit was made to the large but plain Perpendicular Church at Catterick. By the courtesy of Sir John Lawson, of Brough Hall, the original contract for the erection of the church, 1413, and the Bridge, 1423, were exhibited in the vestry. Mr. Brock referred to the executed work as illustrated by the contract, and pointed out that it was well executed, but singularly coarse in detail. Some monuments and the sedilla were evidently portions of the former church. A glance was given at the Roman Station, Cataracto, and the Roman road passing it, and the party then returned to Darlington. At the evening meeting papers were read by Dr. J. W. Eastwood, on "Sockburn, Dinsdale, and the Roman Roads"; and by Mr. E. Hutchinson on the "Palatinate of Durham."

Saturday, July 31st, was devoted to the inspection of the antiquities of Sockburn and Dinsdale, various other objects of interest *en route* being visited. The first stoppage was made at Croft, where the quaint old church was described by Mr. Pritchett. It is a long, broad church, having roofs very little removed from flat. There is a low square tower at the south-west angle, built on a more ancient wall, and at the west end are remains of a very early Norman doorway, which was blocked in Mediæval times. The aisles north and south are devoted to large heavy tombs of local families, and there are some large flights of oak steps ascending into pew-like boxes, on a line with the capitals of the nave arches. There are some good Geometrical windows, and several later insertions of about 1350, notably the sedilia and an aumbry, covered with quaint carving and foliage. A fragment of very good Saxon interlaced work, part of the shaft of a cross, does duty as one side of an aumbry, at the east end of the north aisle.

The fine old Mediæval bridge at Croft was inspected, Mr. Pritchett guiding the party to the ancient side, the bridge having not long since been widened in the old style.

Hurworth Church was then visited, and Mr. Pritchett pointed out that six pillars are alone visible in the nave of the ancient building. The tower is, however, the original one, but cased with modern stonework in a poor Gothic style. Mr. Pritchett's recent additions to the church consist of a well-proportioned chancel and side aisles. There are two ancient effigies of knightly figures in the tower, said to have been removed from the neighbouring Neasham Abbey.

The drive was continued along the banks of the Tees, past the site of the Abbey, of which no traces remain, to Neasham Ford, which was once the only practicable one on the main road northwards in old times, until the erection of Croft Bridge. It is most probably on the line of a Roman road. The storm of the early part of the morning ceased shortly after passing this point, and the beautiful scenery of the Tees' banks was seen in all the beauty of sunlight, as the carriages passed along the ancient road, which gives access to the Sockburn peninsula, formed by a singular bend of the Tees. The party then inspected the ruined church at Sockburn, which was described by Dr. Eastwood. It is a beautiful ruin in a charming spot, close to the modern Hall. Much regret was expressed that so interesting a building as is this church should ever have been allowed to become a ruin. It was perfect until about forty-five years since, when the then Bishop of the diocese permitted the removal of the

church to the opposite bank of the Tees, where, to gratify some passing caprice of the then owner of Sockburn, a new poor-looking building was erected, and the ancient fabric allowed to go to ruin. Within its roofless walls is a perfect museum of Saxon incised stones, portions of shafts of crosses, crosses and sepulchral slabs, one being a "hog-back" tomb, brought from the Hall for better inspection of the party, by direction of Sir Ed. Blackett, the present owner. Mr. Loftus Brock pointed out some fragments of Saxon masonry still forming a portion of the church walls. In the Hall an effigy of a knight in chain armour was inspected, and also, by Sir Ed. Blackett's courtesy, the celebrated falchion, said to be the weapon with which the Sockburn Worm was slain. This was presented to the bishops of Durham on their first entry into the diocese, mostly on Croft Bridge, as the tenure on which the Sockburn estates were held. This singular custom is known to have been in existence from a very early period, and it has been practised down to modern times. The party proceeded to the ancient Manor House of Dinsdale, after having been entertained at luncheon at the Salmon Leap at Pountney's Mill, by the owner, the Rev. Scott Surtees. The house is a plain building, with massive walls, a secret chamber, and some quaint old oakwork. The site is, however, remarkable for being enclosed with a network of low earthen banks, which appear to be ancient British. Within these, enclosing the area of the Manor House, is a well-formed deep moat, probably of Roman origin. Within this the massive foundations of a castellated keep have recently been excavated by Mr. Surtees. These were examined by the party, and appear to be thirteenth-century work. There are some curious masons' marks on the stones. A basement with a central pier has been completely cleared of earth, and is, with the stone steps leading to it, in very perfect condition. A curious brick-built furnace, of doubtful age, and an ancient pitched road across the moat, have also been excavated. The church, close to the Manor House, was then inspected, and Mr. Pritchett, who restored it, and Dr. Eastwood rendered appropriate descriptions. In the porch have been built up for security a great number of Saxon incised stones, having elegant knot-work patterns, while in the church is a large portion of a well-preserved "hog-back" tomb of the same early date. The party, some riding and some walking along the charming banks of the Tees, then made their way to Dinsdale Spa for tea, after which Darlington was reached in time for the closing meeting, over which Sir J. A. Picton presided. Papers were read by Mr. E. P. Loftus Brock, F.S.A., on the "Peculiarities of the Churches of Durham," and by Mr. Geo. R. Wright, F.S.A., on "The Sockburn Worm, and other such Legendary Creatures." After which, various complimentary votes of thanks were proposed to the Mayor and Corporation of Darlington, the Bishop of the Diocese, and others. The meeting broke up at a late hour.

Cable Tramways. — Mr. E. Pritchard, M. Inst. C.E., one of the engineers of the Birmingham Central Tramways Company, has just returned from America, where he has, on behalf of the company, been making exhaustive inquiries into the working of the various systems of cable tramways which have been adopted in the States with a view to the adoption of cable locomotion on the Handsworth and Bristol road routes in that town. Mr. Pritchard is stated to have gone out somewhat prejudiced against the cable system, and decidedly sceptical as to its adaptability to meet local requirements, but, according to the *Daily Mail*, he has come back thoroughly convinced, not only that cable trams are perfectly feasible, but that they are, all things considered, the most economical and desirable form of street locomotion yet put into practice. In consequence of the severity of some of the gradients on the Handsworth and Bristol Road routes,—especially in Hockley-hill and Snow-hill, — and the fact that certain objections were raised to the use of steam-power by the residents, the attention of the company was turned to cable trams, and as a result of Mr. Pritchard's favourable report upon the cable system of haulage it is stated that that system will, in the course of a few months, be tried on the route in question.

RAILWAY EXTENSION IN THE COLONIES.

A PAPER on "Railway Extension in the Colonies" was read at a conference held at the Colonial and Indian Exhibition last week by Mr. J. S. Jeans. The author began his paper by pointing out that this was a subject of almost equal interest to the Colonies and the mother country: to the former because no other single influence could so materially aid their development, and to the mother country because she would for a long time be called upon to supply the greater part of the materials of construction, and because the colonies would take more of our home produce, the more they were able to export themselves. The experience of the United States had shown that there was a close relation between railway facilities and the development of foreign trade, and that the more the exports were increased the greater was the volume of imports, although the two did not exactly nor necessarily run on all fours. Britain now imports over 125 million pounds worth of food supplies, of which America furnishes fully 30 millions worth. It is of great importance to England to endeavour to assist the colonies to take the place of the United States in this regard, because the United States were a hostile nation in commercial affairs, imposing as they did an average duty of 45 per cent. on the whole of their imports, with a view to the exclusion of foreign commodities. The immense development of the trade of the United States within recent years was clearly traceable, in great part, to railway extension. There were now 130,000 miles of railway opened in the United States, whereas our Australian colonies had only 7,000 miles for an almost equal area, and Canada, for a larger area, excluding Alaska, had only 10,000 miles. Assuming that a railway contributed to the opening up of a country for twenty square miles on either side, the railways of the United States would be equal to opening up about 5½ millions of square miles, or nearly double the absolute area of the country, excluding Alaska, whereas the railways so far built in Canada were only equal, on the same basis of estimation, to opening up about 400,000 square miles, or very little more than one-ninth of the whole. The railways of India provided for opening up about half a million square miles, or rather over one-third of the whole, and the railways of Australia provided facilities for 280,000 square miles, or one-eleventh of the whole continent. The total mileage of railways now constructed in the British colonies was about 30,000 miles, being an average of one mile to every 7,379 of the population and every 269 miles of area. In the United Kingdom, there is one mile of railway to every 6½ miles of area, and in the United States one mile of railway to every 25 miles of area. If our colonies had the same relation of railway mileage to area as the United States, their total railway mileage would be upwards of 330,000 miles. The freight rates of our colonies were generally higher than those of Europe, but in India and in Canada they were lower. The latter country had to arrange railway rates so as to compete for trans-continental traffic with the United States, where, within the last ten or twelve years, the rates had been reduced on an average by one-half, and where freighters were now paying the railways 100 million pounds per annum less than they would have had to pay for the same volume of traffic in 1872. It was of great importance to our colonial progress that the rates should be kept low, as this would develope traffic more rapidly, and better enable the colonies to compete with the United States. That they were able so to compete had been sufficiently proved by the enormous increase in their exports of bread-stuffs to Europe within recent years. With the exception of India, Queensland, and New South Wales, in each of which the railways were now paying over 4 per cent., the colonial railways were not generally so remunerative as to tempt capital on their merits. Canadian railways only paid an average of 1·4 per cent.; Victorian railways, 2·91 per cent.; New Zealand railways, 2·51; and Cape Colony railways 2·65 per cent. Railway promoters should endeavour not only to ascertain the traffic actually existing or available, but also the traffic likely to be created. Experience had shown that in the colonies traffic developed very rapidly, and in some cases a net traffic of less than 300*l.* per mile per annum was equal to yielding a dividend of over 4 per cent., whereas it required over 1,700*l.* per annum to pay the same rate in England. It was of the greatest importance to the colonies that they should be furnished in the shortest possible time, and on the greatest attainable scale, with railway facilities, in order to transport the produce of their wheat-fields and vineyards, their sheep-runs, and their cattle-ranches, to the markets of Europe, and for this purpose colonies were justified in undertaking an expenditure and incurring a debt that would not be otherwise justifiable.

COMPETITIONS.

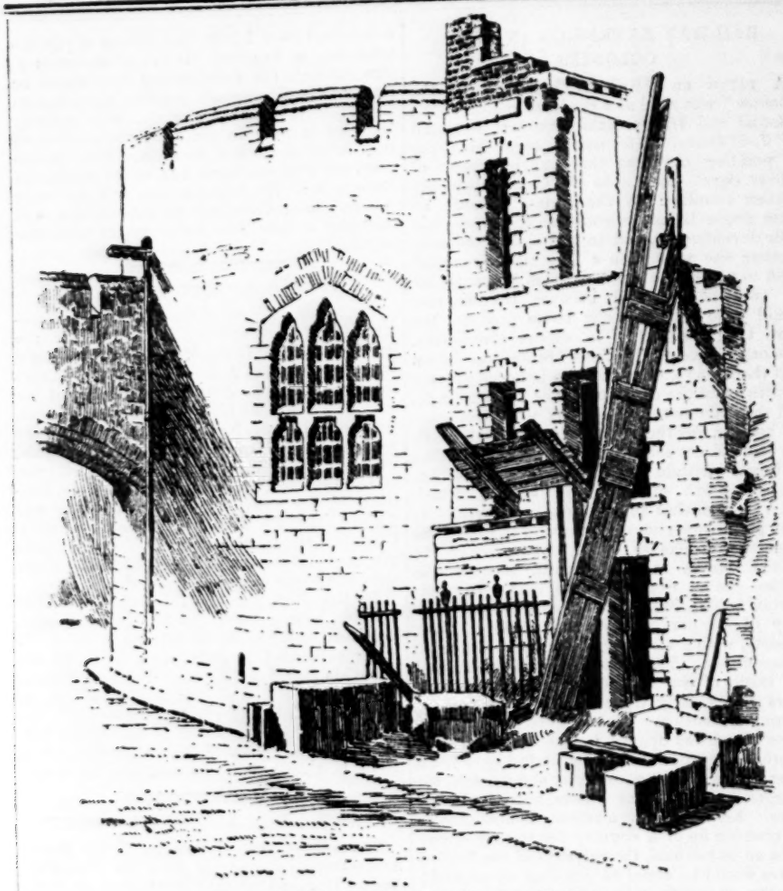
The Fleming Memorial Hospital, Newcastle.—Mr. Henry Currey, F.R.I.B.A., London, the referee appointed by the President of the Royal Institute of British Architects, at Mr. Fleming's request, to advise him in the matter of the competition for the Fleming Memorial Hospital for Sick Children, Newcastle, has awarded the premiums as follows:—1st, 50*l.*, design marked "Simplex," by Messrs. Quilter & Wheelhouse, of London; 2nd, 30*l.*, to Mr. Ronnthwaite, Benfieldside, for design marked "Sweetness and Light"; 3rd, 20*l.* to design "Civis," by Messrs. Clark & Moscrop, of Darlington. The buildings are expected to cost at least 15,000*l.* There were thirty-one designs submitted.

Stirling High School.—The School Board of Stirling having called in Mr. John Kinross, architect, Edinburgh, to adjudicate upon the plans submitted in this competition, he has given his award as follows:—1st, "Stare super vias Antiquas"; 2nd, "Heir I forbeared my name or arms to fix"; 3rd, "Simplicity." The Board acting on the advice of the referee have instructed the author of the design placed first, Mr. J. M. MacLaren, to proceed with the work.

SUSSEX ARCHÆOLOGICAL SOCIETY.

THE annual general meeting of the Sussex Archæological Society is fixed for Thursday, August 19th, and will take the shape of an excursion to Bexhill, Ninfield, Penhurst, Normanhurst, and Hooe. At Bexhill the party will inspect the church, and also an ancient memorial stone recently brought to light. Ninfield will be next visited, and the interesting old church shown. Proceeding by "God's Providence House" and Standard Hill, the party will visit Ashburnham Vicarage and Court Lodge to view some interesting articles collected for inspection, and be shown the furnace which was the last smelting furnace at work in Sussex, and is, therefore, an interesting relic of the extinct Sussex iron industry. The Rev. R. F. Whistler will next conduct the party over Penhurst Church and the Manor House. Tower Creep will also be visited, and the party will then repair to Normanhurst to dine in the grounds, by the kind permission of Sir Thomas Brassey, who will take the chair. The return journey to Bexhill will be by way of Hooe.

The Proposed Hospital for Small-pox Patients.—At the meeting of the Metropolitan Asylums Board on Saturday last a report was received from the Committee for General Purposes recommending that the Local Government Board be asked to at once issue the order promised in their letter of July 12, 1884, authorising the managers to raise on loan and expend the sum of 116,000*l.*, being the amount which it is estimated will be required for the erection of the proposed hospital for convalescing small-pox patients, on the managers' estate at Darenth. Captain Galton moved the adoption of the recommendation, and detailed the progress of the scheme. The Local Government Board raised a question as to whether it would be better to erect temporary buildings instead of permanent structures. He urged that brick buildings should be erected for the proposed hospital, on the ground that wooden huts presented a great danger from liability to fire, were more difficult to keep at a good temperature, were liable to become saturated with infection, and would cost a large proportion of the sum of 116,000*l.* required for the building of brick huts. The money for the erection of brick buildings could be borrowed and repaid at the rate of 6,000*l.* a year for thirty years. He moved the adoption of the recommendation. Some opposition was offered, but on a division being taken thirteen voted for the adjournment of the question and twenty-six against it. The recommendation was then confirmed by a large majority.



The Last of the Old Treasury House at the Tower.

THE LAST OF THE OLD TREASURY HOUSE AT THE TOWER.

This sketch shows all that was left a few days ago of the Old Treasury House at the Tower of London, referred to in our article of last week (p. 157, *ante*).

Illustrations.

DESIGN FOR PROPOSED NEW CHURCH, TEDDINGTON.

The above design, which was exhibited on the walls of the recent Academy exhibition, is from a drawing by Mr. Ernest C. Lee. The design was originally made for a church for Teddington, though not, we believe, ultimately adopted.

WAREHOUSES, ROCHESTER-STREET, WESTMINSTER.

These premises are situate at the corner of Rochester-row and Rochester-street, Westminster. They are built for Messrs. T. & W. Farmiloe, lead and glass merchants, and have frontages in Rochester-row and Rochester-street of 45 ft. and 85 ft. respectively.

The two elevations are faced with red bricks, supplied by Mr. James Brown, of Broad-street Buildings, and Portland stone is used for the cornices, window-heads, cills, &c.

The floors are constructed of 11 in. by 3 in. wood joists, carried on 12 in. by 6 in. rolled iron joists, 10 ft. apart, supported on cast-iron columns. The whole of the ironwork used is of English manufacture, and was supplied by Messrs. Young & Co., of Eccleston Iron Works, Pimlico.

There is a large hydraulic lift in the back portion of the premises for raising and lowering goods, which was supplied by Messrs. Easton & Anderson.

The building was designed by Messrs. Isaacs & Florence, and carried out under their superintendence by Messrs Prestige & Co. Mr. R. Mann acted as clerk of works.

The cost of the building was about 6,000*l*.

NORWICH REGIMENTAL DEPÔT BARRACKS.

The illustration which we give of a portion of this barrack comprises the officers' quarters and mess establishment, the quartermaster's quarters and stores and commissariat stores, the orderly-room and paymaster's establishments, militia offices, arms-store, and guard-house.

The barracks have been designed to accommodate one field officer, eight officers, thirty-two sergeants, and 256 rank and file.

The barrack-rooms are of special type, being capable of division by self-coiling steel shutters so as to render the rooms more comfortable when, as is sometimes the case in depôt barracks, they are only partially occupied.

Each man has 600 cubic feet of space and 56 ft. superficial area in the barrack-rooms, and 5 ft. superficial of window space. Each sub-division of each room will be warmed by an open stove emitting warmed fresh air and provided with a small oven for keeping messes warm, and racks for drying great-coats. These stoves have been specially designed for the War Department by Messrs. Yates, Haywood, & Co.

An important feature in the arrangement of the buildings is the position of the drill-shed, which is so placed as to afford efficient cover to the men when going to or from the various accessories, such as cook and bath houses, straw-store, &c., which are placed in rear of the barracks.

The married sergeants and soldiers will each have a quarter containing two rooms and a small kitchen or scullery; and the warrant officers will have still more accommodation.

The recreation establishment will consist of recreation, reading, and coffee rooms,—each connected with a central bar,—a kitchen and accessories, a shop for groceries, and a manager's quarters.

The canteen, although attached to the recreation establishment, is kept distinct from it by a party wall, and the access to it is by a separate entrance on the far side of the building.

The water-supply will be from a well purposely sunk within the War Department boundary, from which source it will be pumped into a 4,500-gallon tank placed in the clock-tower whence it will be dispersed to the several cisterns throughout the buildings.

The site has been well chosen, and occupies one of the highest plots of ground in the neighbourhood of Norwich. It was presented to the War Department by the Mayor and Corporation, and the building we illustrate will overlook the city. The soil is gravel, and, as may be seen, the ground in front is broken and picturesque. The most has been made of this peculiarity, as, instead of the usual unsightly boundary-wall, a retaining wall has been substituted, on which some of the buildings stand, giving a bold and defensible effect to the several structures.

The style, with its gables, red brick walls, and tiled roofs, will harmonise well with the prevailing architecture of the city, and Sir Andrew Clark may be congratulated on the numerous improvements he has introduced, and which are exemplified in this new type of barrack construction.

The cost of the undertaking, including the hospital, will be about 54,000*l*.

The contractors are Messrs. Kirk & Randall, of Woolwich.

The buildings were commenced in May last, and will be completed within two years from the date of signing the contract.

A VILLAGE COFFEE-TAVERN, &c.

We illustrate a perspective sketch of a building that was to be erected in the village of Street, in Somersetshire, but was modified before execution, as the acquirement of a public-house in the village and its conversion into a coffee-tavern, rendered it unnecessary to embody the latter in this block.

The large archway gives access to the hotel, and also to stables at rear, and the hotel bedrooms are at this end on the first and second floors. The hall is over the men's and women's dining-rooms, whilst its platform would be over the fire-engine shed.

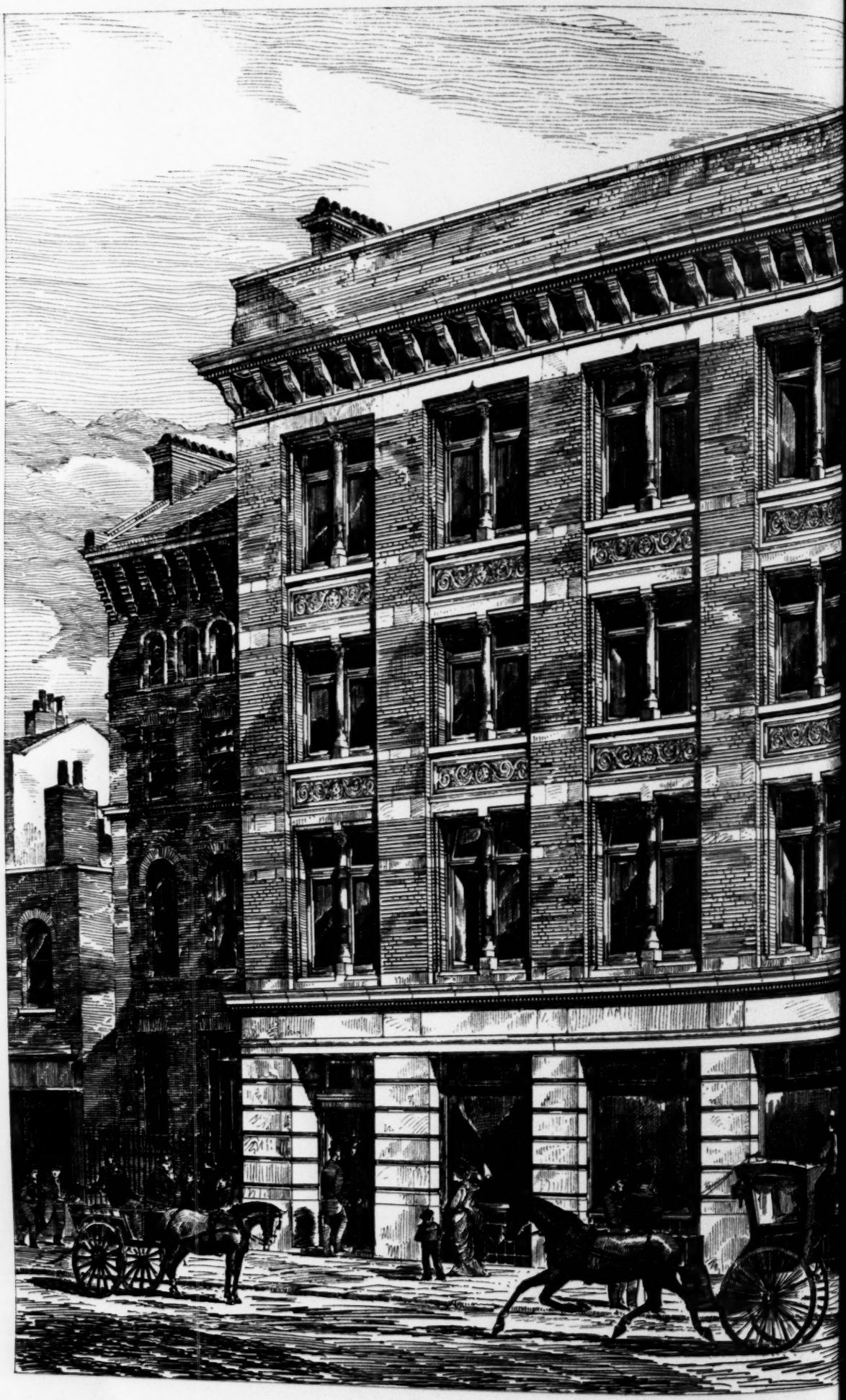
The materials proposed are local blue lias stone, Ham Hill dressings, and Broseley tiles for roofs.

The architect is Mr. George J. Skipper, of Norwich.

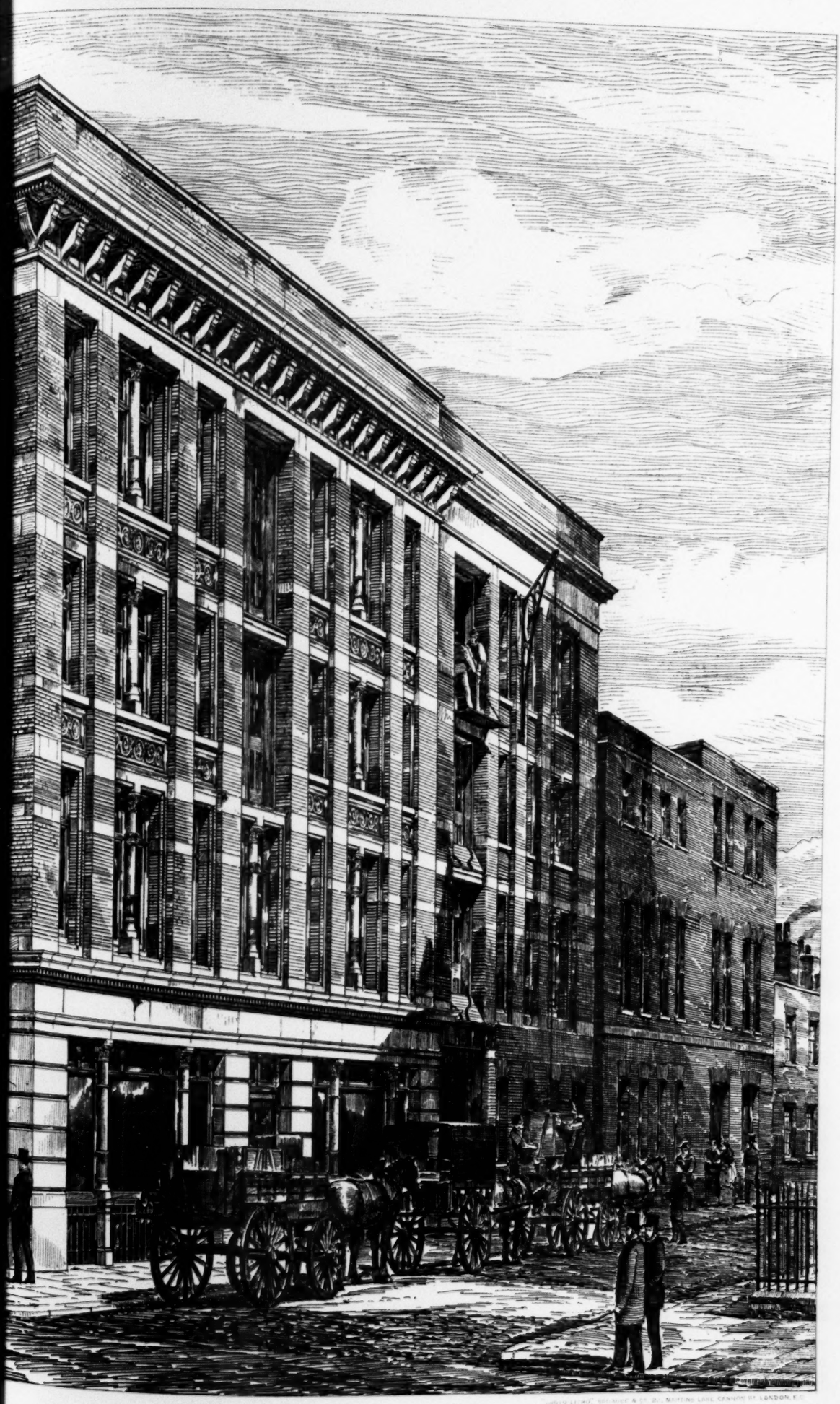
TWO HOUSES, TWICKENHAM.

As will be seen by the plans, the two houses are dissimilar both in size and arrangement, and externally have been treated in a manner giving in perspective the appearance of one considerable block, without the obtrusion of divisional lines in the building. The view shows the garden front. The work is carried out in bright stocks, with red brick bands, cornices, arches, &c. The roofs are covered with red plain tiles, the bays and porches to the front are in wood, the bays in view of red brick. The details have been carefully carried out from the architect's designs, and the cost of the whole, complete, ready for occupation, was 1,680*l*. Messrs. T. & W. Hickinbotham, of Teddington, were the builders, and the architect was Mr. Thos. R. Richards, of King-street, Cheapside.

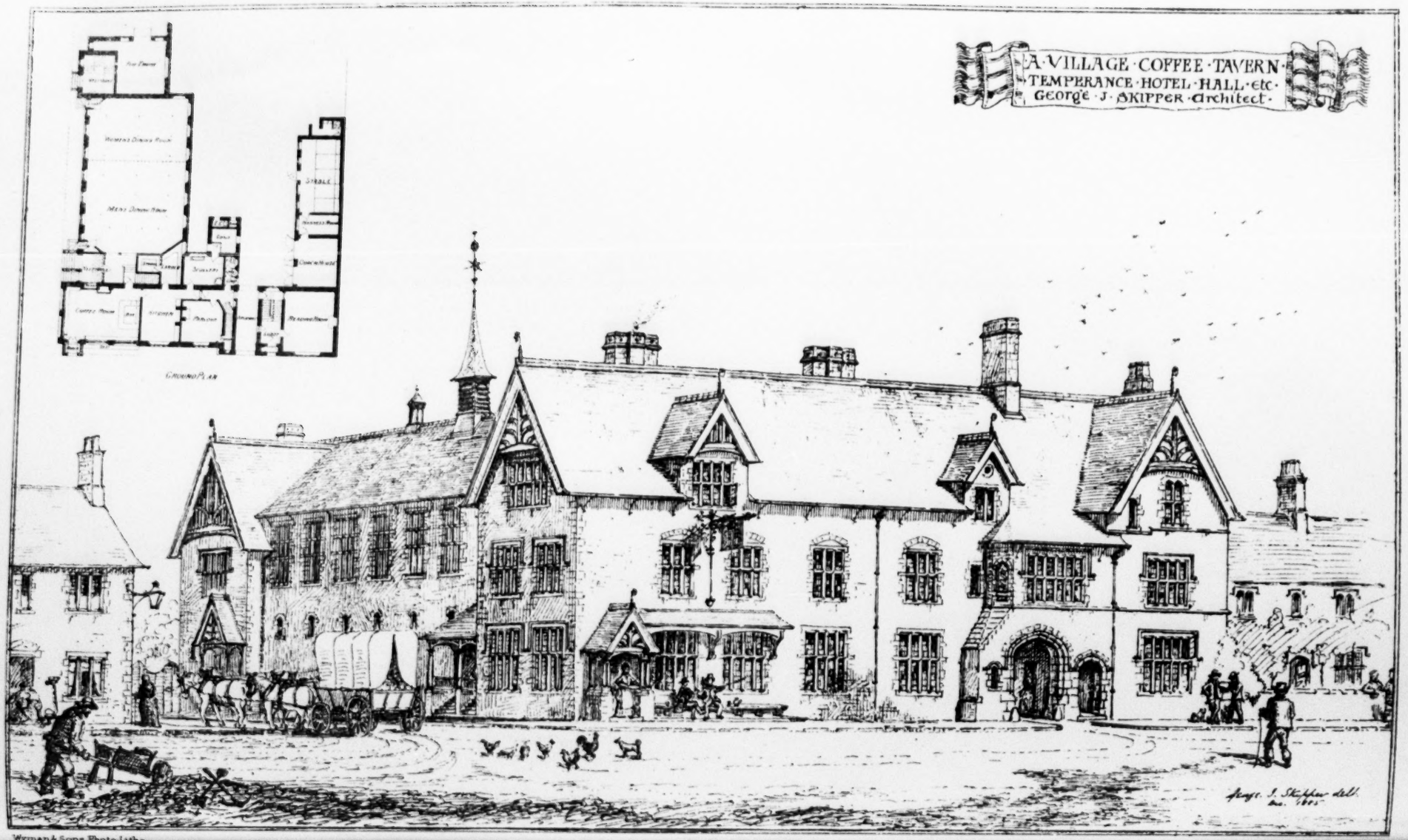
The Roman Baths at Bath.—A quarterly meeting of the Bath Town Council was held on Tuesday, the ex-mayor (Mr. Handel Cossham, M.P.) presiding, in the absence of the mayor. Alderman Murch asked if the Baths Committee had communicated with Lord Carnarvon or some other eminent archæologist in order to ascertain whether the old Roman bath would in any way be interfered with by the building of the new baths.—Alderman Wilkinson said a communication to Lord Carnarvon had been sent, but he believed no reply had yet been received.—Alderman Murch thought there was a necessity for carrying out the resolution that Lord Carnarvon or some other archæologist should give their opinions as to the extent to which any of the old Roman baths would be interfered with.—Alderman Wilkinson said they certainly intended to invite Lord Carnarvon or some other gentleman before they proceeded to build upon the foundations of the houses just taken down.—The ex-mayor said he valued the improvements and alterations about to be made in the baths, but he should very much deprecate them if they were done at the sacrifice of the old Roman baths. He hoped every step in dealing with these baths would be brought before the Council.



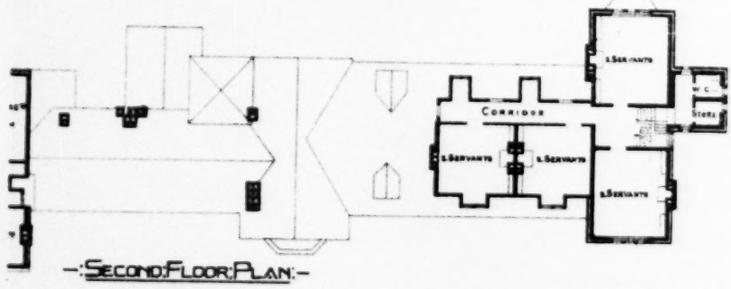
WAREHOUSES, ROCHESTER STREET, W



TER.—Messrs. Isaacs & Florence, Architects.

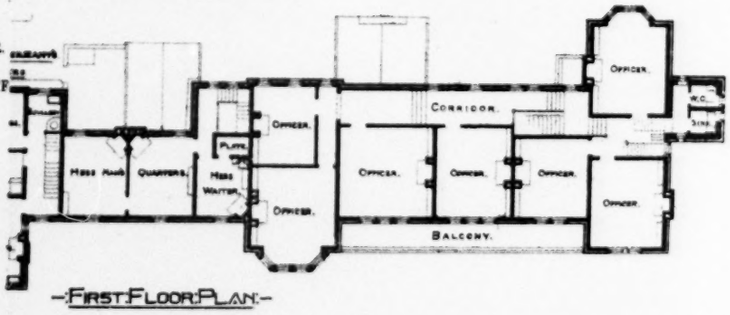


Wyman & Sons, Photo-Litho.

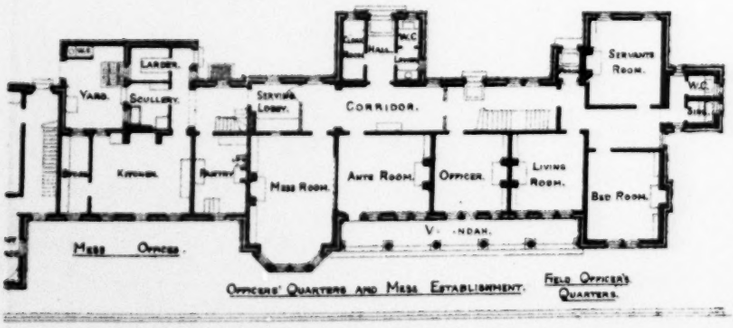


-:SECOND FLOOR PLAN:-

RAWN BY MR.
WAR OFF

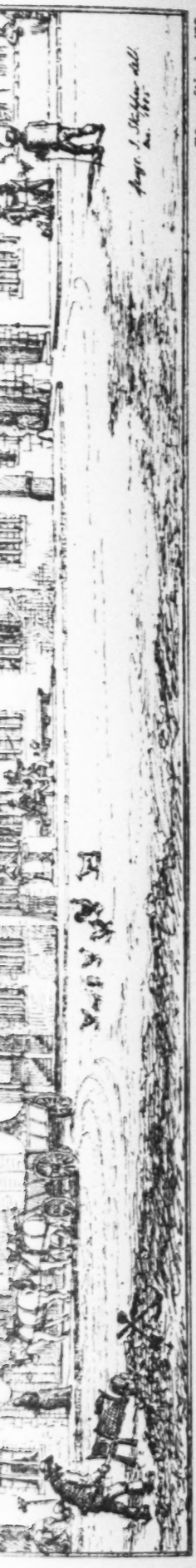


-FIRST FLOOR PLAN:-



Officers' Quarters and Mess Establishment. Field Officer's Quarters.

CF



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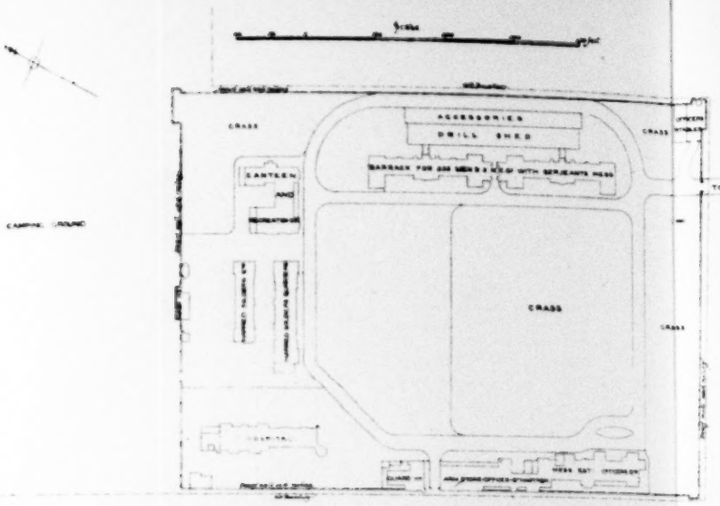
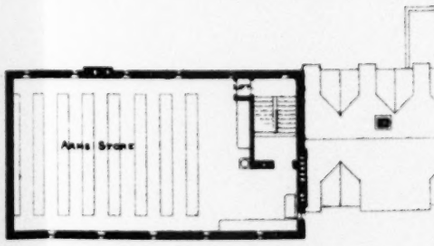
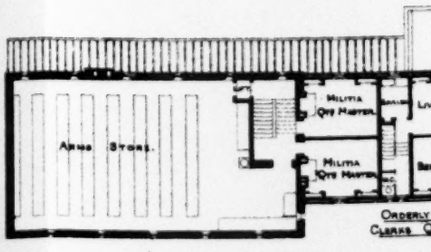


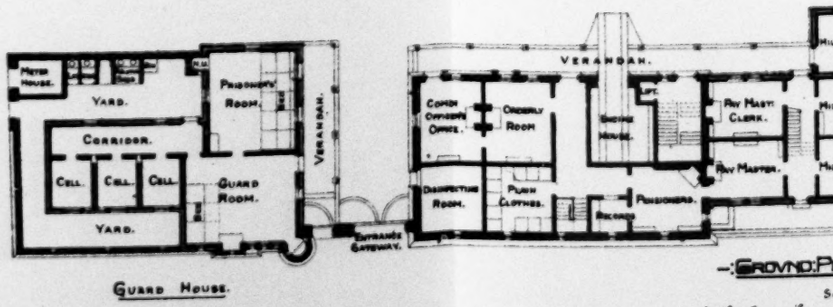
—:BLOCK:OVERLOOKING:THE:CITY:—



NORWICH REGIMENTAL DEPOT BARRACKS.

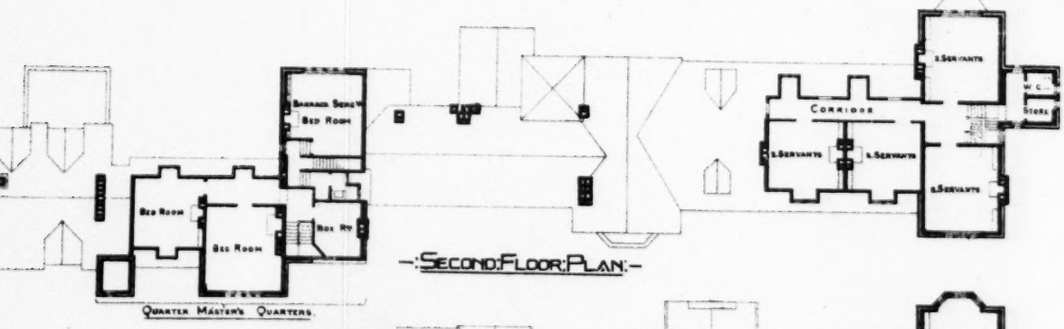
DRAWN BY MR. J. MECHELEN ROGERS, A.R.I.B.A., FROM DESIGNS PREPARED IN THE WAR OFFICE UNDER THE INSPECTOR-GENERAL OF FORTIFICATIONS, 1885.

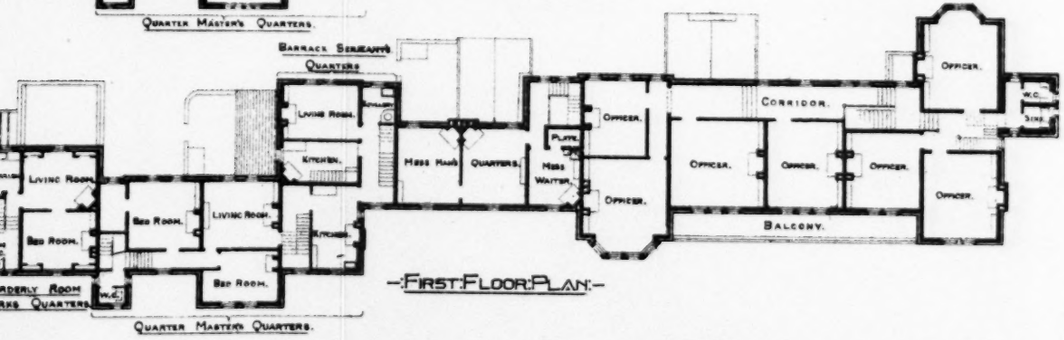


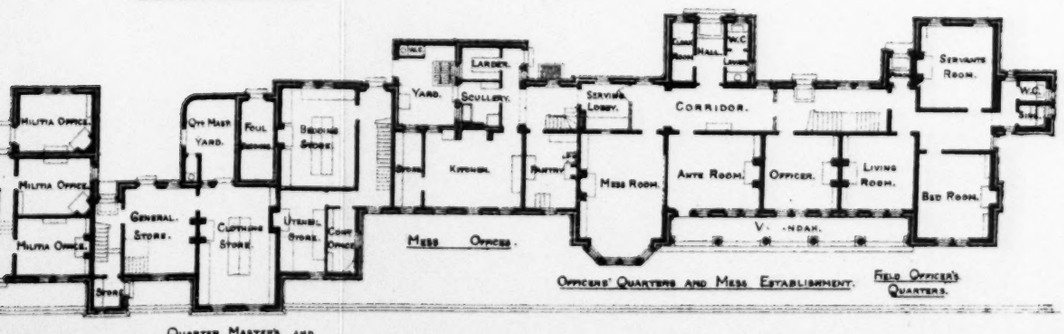


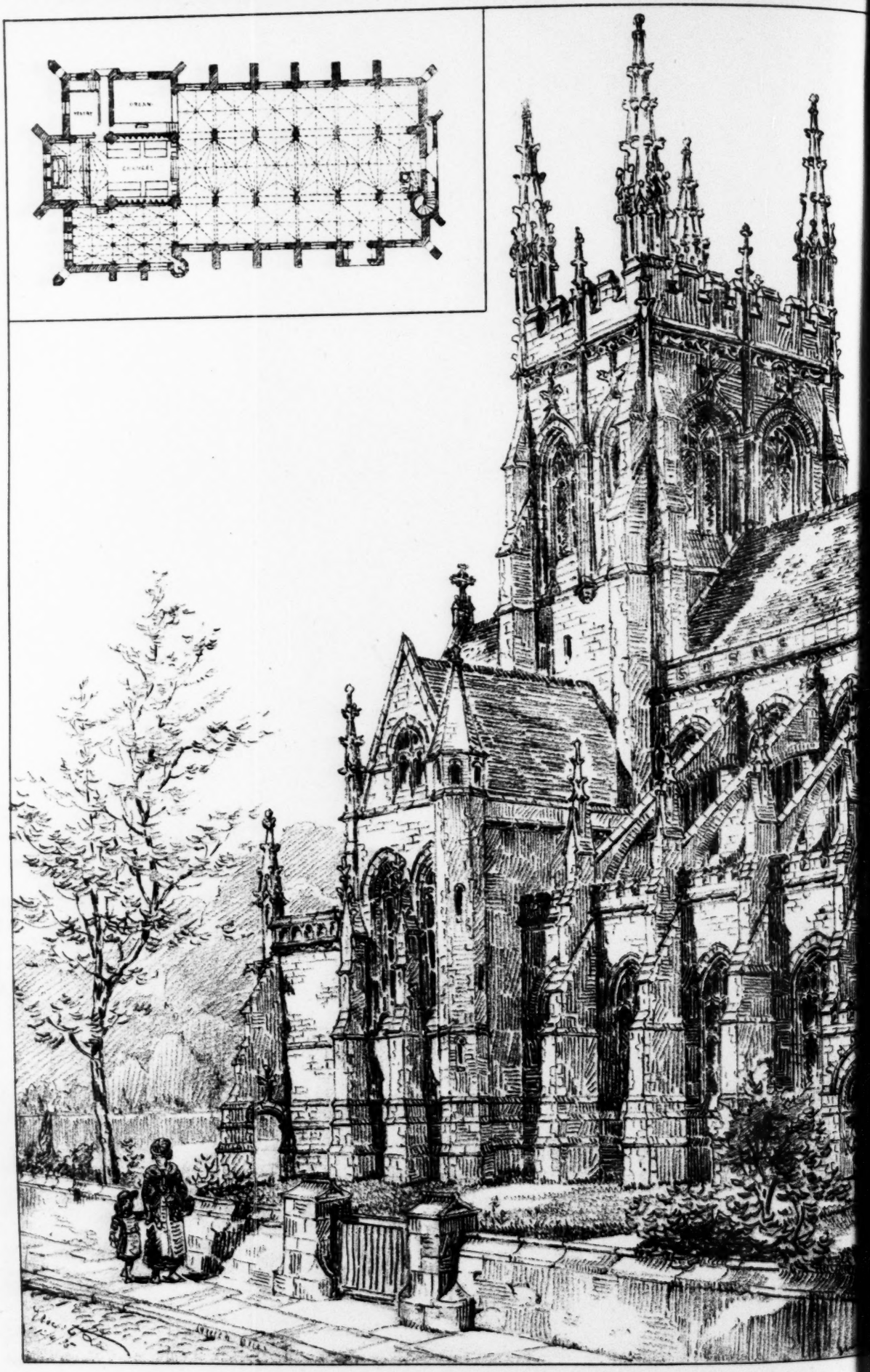
GUARD HOUSE.

—:GROUND:P

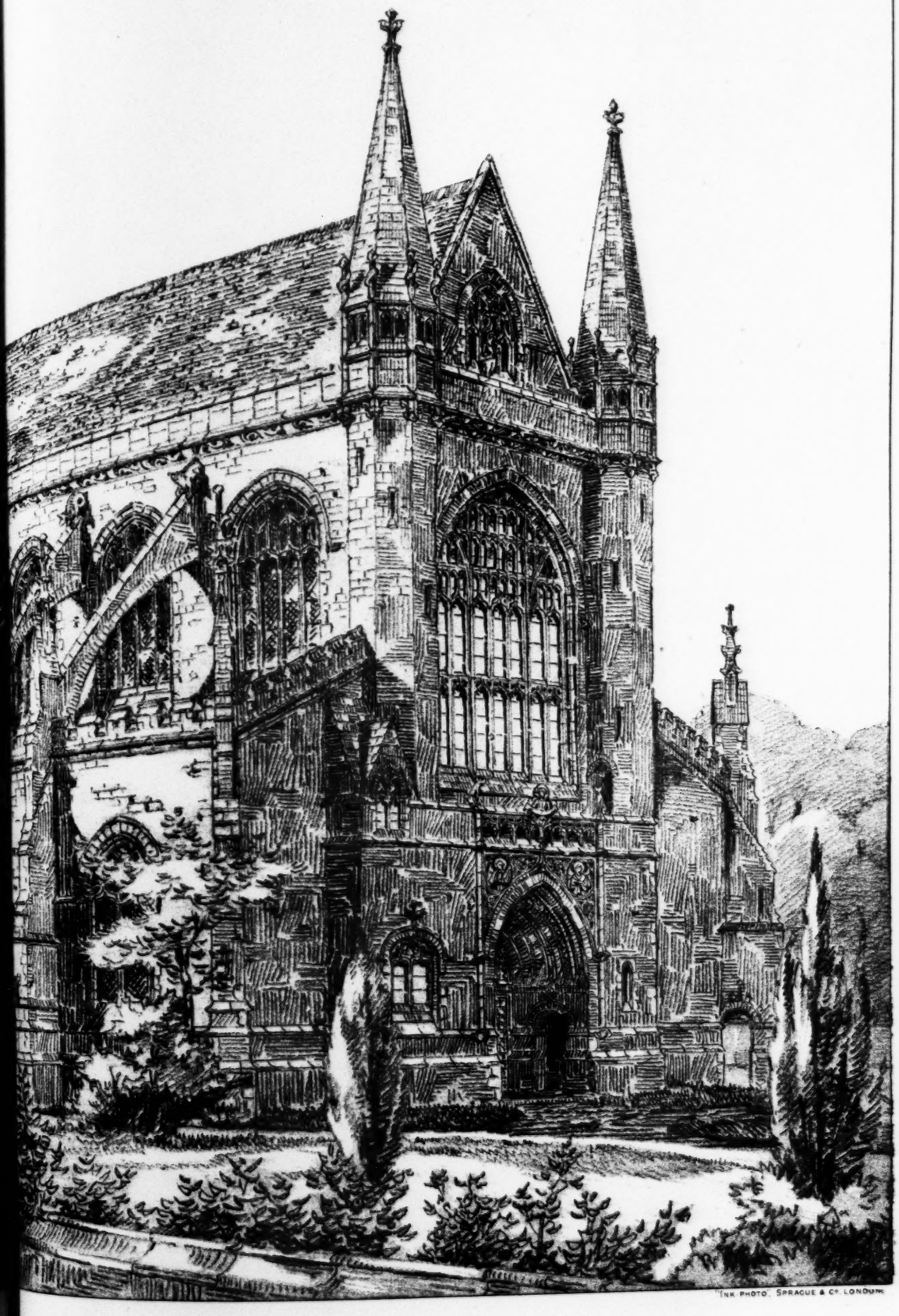

Bed Room
Bed Room
Box Rm
Quarter Master's Quarters.
Barrack Sergeant's Bed Room
Corridor
3 Servants
3 Servants
3 Servants
3 Servants
W.C.
Store
-:Second Floor Plan:-


Living Room
Bed Room
Bed Room
Living Room
Kitchen
Bed Room
Quarter Master's Quarters.
Barrack Sergeant's Quarters
Living Room
Kitchen
Mess Room
Quarters
Plate
Mess Waiter
Officer.
Officer.
Corridor.
Officer.
Officer.
Officer.
Officer.
Officer.
Balcony.
W.C.
Sink
-:First Floor Plan:-


Militia Office
Militia Office
Militia Office
Store
General Store.
Clothing Store.
Utensil Store.
Court Office
Qr. Mast. Yard.
Foul
Bedding Store.
Mess Office.
Yard.
Scullery.
Larder.
Kitchen.
Pantry
Service Lobby.
Mess Room.
Corridor.
Hall
W.C.
Ante Room.
Officer.
Living Room.
Bed Room.
Servants Room.
W.C.
Verandah.
Officers' Quarters and Mess Establishment.
Field Officer's Quarters.
Quarter Master's and Commissariat Stores.
Scale of Feet

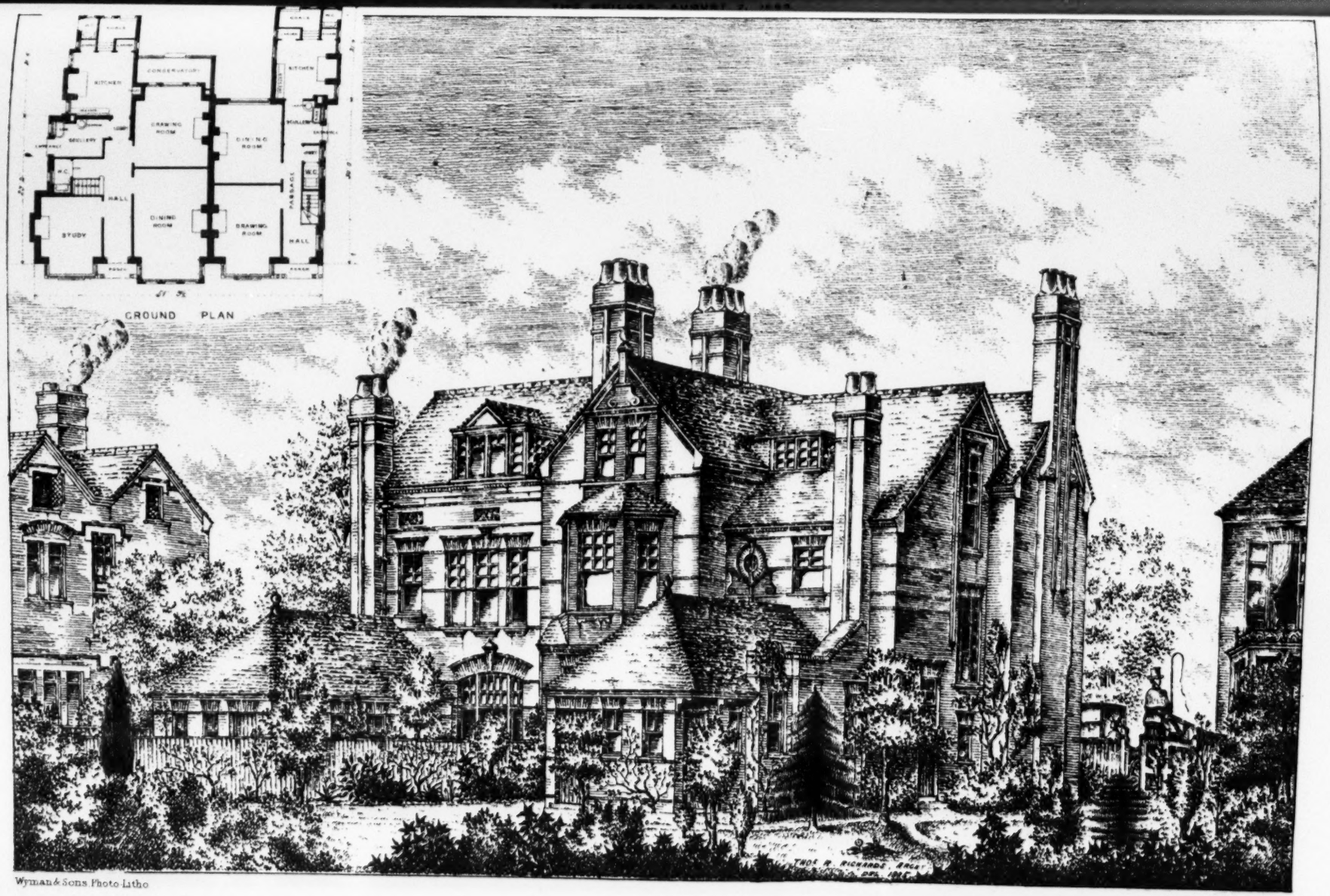


DESIGN FOR PROPOSED CHURCH, TE



INK PHOTO. SPRAGUE & Co. LONDON.

L.—Mr. Ernest C. Lee, F.R.I.B.A., Architect.



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6 Queen St London WC

TWO HOUSES, TWICKENHAM.——Mr. Thos. R. Richards, Architect.

The Bickersteth Memorial Hall, Hampstead.

THE BICKERSTETH MEMORIAL HALL, HAMPSTEAD.

This building, of which we recorded the laying of the foundation-stone a few weeks ago, is to form the completion of a testimonial to the Right Rev. Dr. Bickersteth, Bishop of Exeter, who was for thirty years vicar of Christ Church, Hampstead. The plan includes a large hall, capable of seating 300 persons, with class-rooms, &c., and will cost about 2,000*l.*, exclusive of site. The architect is Mr. Wilfrid J. Hardcastle, and the builders are Messrs. E. C. Howell & Son, of London and Bristol.

BERKSHIRE ARCHÆOLOGICAL AND ARCHITECTURAL SOCIETY.

The second summer excursion of the Berkshire Archæological and Architectural Society took place on the 20th ult., the places visited including the interesting old town of Wantage, and some picturesque villages in its vicinity, together with Lockinge House, the residence of Lord Wantage, and Hendred House. The weather throughout the day was charming, and the drives through the pleasant tract of country included in the day's programme were much enjoyed. The number of the buildings and other objects of interest to be inspected was large, and the time devoted to each was necessarily limited. Admirable arrangements had, however, been made by the honorary secretary of the society (Mr. S. Slingsby Stallwood), and the rather crowded itinerary was got through well within the allotted time, although not without fatigue to some of the less enthusiastic members of the party. The excursionists, who numbered upwards of fifty, left Reading by the 9·50 a.m. train for Wantage.

On the arrival of the party at Wantage,

Mr. Stallwood read an interesting paper on the lands and church, in the course of which he said:—Wantage, anciently Wanting (an appellation still retained in the name of the hundred), was in Saxon times one of the palaces of the kings, and here, in 849, Alfred was born. He died in 900, and, by will, gave the manor to his wife, Ealswith, daughter of Ethelred, Earl of Mercia; after her death it reverted to the Crown, and at the time of the Norman Survey it was reckoned as part of the Royal demesne. The Fitzwarrens, lords of the manor of Wantage, were the original founders of Wantage Church in the thirteenth century, and they were doubtless intimately associated with the several alterations which took place at various periods up to the middle of the fifteenth century. There appeared to be about the church no work of earlier date than the middle of the thirteenth century, but it was known that work of the Norman period did exist in the remains of a building which up to a few years ago stood in the present churchyard. Leland, in referring to Wantage, says that "it is remarkable as having two churches in one churchyard." One of the "churches" here named must have been the ruins of this building, the north doorway of which,—of the Norman period,—had been rebuilt at the new Grammar School, and was a very fine specimen of the work of that date. Within the church itself the earliest work which he had been able to discover was in the north transept, a fine clustered shaft, with cap and base, dating about A.D. 1250, which occupied a position seeming to have no relation to its immediate surroundings, and which was all the more curious from the fact that a portion of the arcade work just above, but in no way connected with it, belonged also to the thirteenth century. To the same date must be assigned the font, the mouldings of which were enriched by the tooth ornament, which was very characteristic of the period. Of the thirteenth century also was the great central tower, with its very massive pillars; the columns and arches forming the nave arcades; the arcade on the east side of the south transept; and also the arches between the nave and transepts, all of which belonged to the time of the reign of Edward I. Doubtless on the completion of the thirteenth-century work the general plan of the church was much as it is now, for although the side aisles of the nave and all the work eastward of the transepts as now existing belonged to a much later period, they were for the most part works which had taken the place of previous erections. The chapel on the south side of the church appeared to have been erected about 1450; the ceiling over a portion of it was boarded with oak, and had carved bosses, which were well worthy of careful study. The chapel on the north side was somewhat later, the mouldings to the caps and bases of the arcading between this chapel and the chancel seeming to belong to the latter part of the fifteenth or early part of the sixteenth century. There was on the east side of the north transept some curious and very interesting mingling of work of three different periods in connexion with the arcade and adjoining walling. The present north and south aisles of the nave belonged to the fifteenth century, and doubtless it was at the time of their erection that the old roof of the nave was removed, the present clearstory built, and the fine oak roof added. This roof was a splendid specimen of fifteenth-century carpentry. The stone corbels supporting the principals were carved in a manner very characteristic of the date, and upon one shield at the termination of the hammer-beams were the Fitz-Warine arms. Within our own day the nave of the church had undergone changes, having been lengthened some 15 ft. by the addition of one bay to the arcading. The windows at the west end of the nave were composed mainly of the old stones of the former windows. A greater change has taken place in the south aisle, the porch, with the priest's chamber above and the staircase leading up to it, having for some reason been pulled down some four years ago and reconstructed at a point some 15 ft. from its original position. The church possessed some fine ancient woodwork in the chancel stalls with *miserere* seats elaborately carved and in excellent condition. Here were also screens between the chapels and the chancel, portions of which were of the fifteenth century, the remainder a restoration. In the chancel were the remains of what must have been a fine alabaster tomb. Some small portions of the elaborate canopy existed, the character of the work upon them indicating that this tomb belonged to about the middle of the fourteenth century. There was no inscription, but the effigies were believed to be those of Sir William Fitz-Warine and his wife. The knight was represented cross-legged, with the order of the garter round his left leg; and the lady wore a head-dress of the fourteenth century. This Sir William Fitz-Warine was the forty-seventh Knight of the Garter in succession from the first institution of the Order. Upon the wall of the north transept was a remarkably fine brass to the memory of Sir William's son,—Sir Ivo Fitz-Warine,—who died September, 1414. In its proper recumbent position it represented the figure of a knight with his head resting on his tilting-helmet, his feet on a lion. He would direct their attention to this brass, as in the whole county of Berks there was only one brass in memory of a knight of prior date to this, and that was to Sir John Foxle, at Bray, dated 1378. This Sir Ivo Fitz-Warine attended the Earl of Buckingham at the siege of Nantes in 1381. Upon the wall in another part of the north transept was a brass of earlier date; it was a fine half effigy of a priest, nameless, and undated, but it might be assigned to about the year 1320; it was one of the earliest brasses to the memory of an ecclesiastic which Berkshire possessed. In the south aisle of the nave, also upon the wall, was a later brass, dated 1522, to the memory of Walter Tawbot and Alice his wife; beneath was a representation of their five sons, but originally there were four daughters represented also. Some other brasses

of minor interest existed, and several which existed many years ago were lost.

The various features of interest in the church having been inspected, including the fine oak stalls and modern embroidery in the chancel, the party proceeded to "The Ham," the residence of Mr. W. L. Nash, who had kindly invited them to luncheon. On the way a call was made at the Grammar School, where the Norman doorway referred to in Mr. Stallwood's paper is now placed, forming part of the new school buildings.

Returning to their carriages the party drove to Lockinge Church, which is undergoing extensive repairs and additions. Mr. A. B. Allin, of Wantage, the architect of the new works which are in progress at the church, proceeded to give some history of the Lockinge lands and church. Lockinge, or Laking as it was called in the Saxon times, and Lachinges, in the Norman Survey, was granted by charter of Queen Adelsuith to the Abbey of Abingdon, in the ninth century, and was held by the Abbey until 1538, when it was placed at the disposal of the Crown. In 1546 the Manor of East Lockinge, together with many other lands, was granted to John Wynchcombe, son of the celebrated Jack of Newbury. His son, Thomas Wynchcombe, alienated this and other estates, and the Manor of Lockinge then passed to the family of Doe, whose names appear in the earliest part of the parish register, which commences in 1546. In 1853 the church, which was in a very dilapidated condition, underwent considerable alterations and repairs under the direction of the late Mr. Street. The chancel was not touched, with the exception of the roof, which was boarded. The south aisle, which was entered by one Perpendicular arch from the nave, was extended westwards, having the two present arches introduced in the place of the Perpendicular one; the walls and roof were also new. The nave underwent somewhat the same process, the old roof and walls being replaced by new, and a north and south porch were added; but the doorways retained their original position. It would thus be seen that the only portions of the church left untouched were the chancel walls and the tower. The chancel, which was almost entirely of the Decorated period, contained one or two features of an earlier date. There was the credence, or ambry, as it might have been, though he (Mr. Allin) thought that if it had been the latter there would be some signs of the hooks for hanging the door. There was the squint, half blocked up, and the outline of a double sedilia, or sedilia and piscina. The credence and squint were of the same date as the Transitional arch leading to the vestry, which had two grotesque corbels. The other arch into the south aisle was Perpendicular, and had what was said to be an altar-tomb. The old tie-beams were all that remained of the fourteenth-century roof. The east window was plain Decorated, but the two north windows had very nice traceried heads, and on looking at them first he thought they were "low-side windows," which were supposed to have been so placed for the convenience of cripples or lepers who could not enter the church. Such windows were, however, always unglazed, and fitted with a shutter, of which there were no signs, and on a careful examination he came to the conclusion that these windows were removed from elsewhere and placed in their present position. As to the question of the object of the recesses on either side of the east side of the chancel, he did not agree with Mr. Parker's opinion that they were probably squints. He believed that the chancel arch, which was of the same date, same mouldings, and same bad and chipped jointing, was also brought from elsewhere, and this would account for the misfit of the recesses, which, no doubt, suited their original position well enough, and being part and parcel of the actual moulded stones of the arch, had to be fitted in as best they could. Probably these recesses were part of an arcade, but certainly not squints, as they would be useless for that purpose. In the south aisle the Decorated east window was the only remaining old feature, but in 1853 there was a Perpendicular west window, which was destroyed when the aisle was lengthened.

From the church the party proceeded to Lockinge House, where, by the courtesy of Lord Wantage, they had an opportunity of seeing the pictures, tapestries, and articles of vertu which adorn the principal apartments. The butler conducted the excursionists through the rooms, calling attention to the tapestries and the chief pictures, which include fine examples of Murillo and Gainsborough. They subsequently visited Ardington Church, West Hendred Church, East Hendred (where Mr. Stallwood read some notes on the parish and the chapel), Hendred House, Harwell Church, and Hagbourne Church.

YORKSHIRE ARCHÆOLOGICAL ASSOCIATION.

The annual excursion of the Yorkshire Archæological and Topographical Association took place last week, when Kirkham Priory and Malton were visited by the members.

At Kirkham Priory, Mr. J. T. Micklethwaite described the buildings. He said the gate-house was almost unique in its design, and, he was happy to say, was in very good preservation. It used to be longer and deeper through than it now was. The date of the gate, he should say, and he was told it fitted very well with the heraldry, was about 1300. It was a very beautiful work indeed, and he should say it was done under Kentish influence; it was more like Kentish than Yorkshire work. The carving of the heraldry was some of the most perfect he had ever seen. After reference had been made to the cross standing near the gateway, a move was made to the west front of the church. Here Mr. Micklethwaite pointed out that the church was turned a good deal to the north, which was done, no doubt, for the purpose of making the most of the ground. Proceeding to near the site of the pulpitum, Mr. Micklethwaite remarked that when at Bolton he said something about the custom of canons building churches without aisles. An antiquary from the North had found fault with him about that. His real statement, however, had been mistaken. He meant that the twelfth-century canons' houses were nearly always laid out without aisles. There, as they would see by the plan, the church had actually no aisle to the nave. That was only exposed a short time ago by the diggings of Mr. St. John Hope, and they had Mr. Hope's plan, which was the most perfect that had yet appeared. On the north side of the cloister was the transept and choir, the extent of the latter being marked by a beautiful fragment at the end. The first work after the foundation would be the building of the choir. Mr. Micklethwaite then gave a detailed description of the cloister and outer buildings, pointing out the position of the flight of steps near the outer parlour, which, he thought, must have taken almost the whole width of the west corner of the cloister.

At the conclusion of Mr. Micklethwaite's interesting and graphic description, Colonel Brooke read a letter which he had just received from the Rev. C. B. Norcliffe, of Langton Hall, Hutton, in which the rev. gentleman gave an account of the heraldry on the outer gateway.

Colonel Brooke then in the name of the Society, expressed their thanks to Mr. Savory, of Kirkham Priory, for allowing them free access to the grounds.

The Dean of York wished to add their regret that Mr. Savory was not able to be with them owing to ill-health.

The visit to Kirkham Priory having been brought to a close, the visitors proceeded by special train to Malton, and at once went to the Talbot Hotel, where luncheon was partaken of. The Dean of York presided, and after lunch he proposed health and prosperity to the Association, in whose name Col. Brooke responded.

Immediately after the luncheon, the company visited St. Michael's Church, where a short stay was made, and after inspecting the building they drove to Old Malton Priory, where a very pleasant half-hour was spent.

The Rev. E. A. B. Pitman, vicar of the parish, read an historical account of the structure. In the course of his remarks he said the history of the Gilbertines, one of whose finest houses was old Malton Priory, must always be a source of the greatest interest to the archæologist and antiquary. That was so for the reason that the Gilbertine was the only purely English order known. The church was only a fragment of what was once a noble minster with three towers. The monastery was designed to contain thirty-five men. In its integrity the Priory Church possessed a transept, with eastern chapels, a choir with aisles, and a short presbytery. The changes in the structure of the church had evidently been made by a sordid pulling down of faulty portions piecemeal, till the present miserable residue only was left. The central tower was taken down, it was believed unnecessarily, in 1636. In 1728 the church was two bays longer than at present. The two bays and the clearstory must have been removed in 1733 or 1734. During the dark age of architecture, which attained its greatest density under the Georges, the remains of the Priory suffered most wofully. The structure was looked upon as a free quarry for the neighbourhood, and whoever required building material repaired thither and found stone ready to his hand. The sides of the lock and mill dam were built of the stones of the church, and when the foundation of the mill dam was removed last year he rescued many of the carved stones. In 1840 some alterations were made in the interior. In 1877, finding that the south-western tower was falling, he called in Sir Gilbert Scott, who pronounced it to be in a most dangerous state, and advised that it should be under-pinned and tied. That was done by Earl Fitzwilliam at a cost of 3,000*l*. The roof was now in a most insecure and dilapidated state, but he hoped very soon to see a new roof taking its place. Whatever was done would not have regard to restoration, but to preservation, and, with his consent, not a single feature of the church would be interfered with.

At the close of the rev. gentleman's account Mr. Micklethwaite described the architectural features of the building, and expressed a hope that, whatever might be done, they would leave the old walls as they were, so that instead of destroying the old history they would simply be adding a new chapter to it.

BRISTOL AND GLOUCESTERSHIRE ARCHÆOLOGICAL SOCIETY.

On Tuesday, a three days' meeting of this society commenced at Dursley. At half-past twelve o'clock a numerous company of the local committee assembled in the town-hall, for the purpose of receiving the visitors. Amongst those present were the President, Sir Henry Barkly, K.C.B., Sir. W. V. Guise, Bart., president of the council; Major-General Vizard, chairman of the local committee; Sir John Maclean; Colonel Forbes, local secretary; and the Rev. W. Bazeley, M.A., general secretary.

Major-General Vizard, as chairman of the local committee, begged, on behalf of that committee, to welcome the Bristol and Gloucestershire Archæological Society to Dursley, and asked the retiring President, Sir Brook Kay, to take the chair.

The report of the Council for the past year was read by the Rev. W. Bazeley. It stated that ten years had passed away since the society was formed for the study of local archæology. During the decade many changes had, of course, taken place in the roll of the society's members. Many who took an active part in the formation of the society had been taken from their midst. It was a source of consolation to them that a record of their labours and researches had been preserved in the Society's Transactions. During the last year they had lost ten members by death. Amongst them they might mention the Rev. Henry Thomas Ellacombe, M.A., F.S.A., who died on the 30th of July, 1885, at the ripe age of 96. His chief study was campanology, and in 1881 he published "The Church Bells of Gloucestershire" and "The History of the Parish of Bitton," from materials which he had been collecting for seventy years. These two valuable contributions to the history of Gloucestershire the society had acquired by subscription. Mr. James Herbert Cooke, who died October 20th, 1885, contributed six papers to the Society's Transactions, relating for the most part to the Lords of Berkeley, their retainers, and possessions. The number of annual members was 416, and seventy-nine life members, making a total of 495, against 510 in the corresponding period of last year, and it was a subject of congratulation that the income of the society was only a little less than it was at the most prosperous period of its existence. The number of subscribing members elected during the year was sixteen. On April 21st the balance at the society's bankers was 157*l*. 4s. 6d., against 156*l*. 11s. 11d. that time last year. When the surplus copies of the Berkeley MS. in the society's possession had been sold to the members, this balance would

be largely increased. The society also had a funded capital of 432*l.* 3s. 8d., representing the composition fees of life members. Three meetings of the society had been held during the year,—the annual meeting at Tewkesbury in July last year, an autumn meeting at Newent, and last June a visit to Deerhurst, with a special view of inspecting the recently-discovered Saxon chapel. Steps had been taken to ensure the protection and preservation of that most interesting relic of Early Ecclesiastical architecture. Until very lately the chapel formed part of a dwelling-house. Abbott's Court belonged to the Ecclesiastical Commissioners, a timbered house of Tudor date being attached to it on the east and a more modern range of buildings on the west. The removal of a tree led to the discovery of a tablet inserted in one of the external walls, recording the dedication of an altar. A further search on the part of the Vicar (Rev. G. Butterworth) and the Ecclesiastical Commissioners' local architect led to the discovery of a Saxon chancel-arch, and Saxon windows and doorway. A great deal of interest had been awakened by communications made to the various journals and learned societies by Mr. Butterworth, Professor Middleton, and others, and a committee, consisting of the following gentlemen, had been appointed to superintend the work thought necessary for the preservation of the chapel:—Sir W. V. Guise (President), Sir John Maclean, F.S.A., Mr. J. Reginald Yorke, Rev. S. R. Dowdeswell, Mr. Algernon Strickland, Mr. W. M. Baker, Mr. J. T. Agg-Gardner, M.P., Professor J. H. Middleton, Rev. E. J. Bower, Mr. S. H. Gael, Rev. F. E. Broome (Wilts), Rev. G. Butterworth, and the Rev. W. Bazeley, General Secretary of the Society. A specification had been presented by Mr. Collins, of Tewkesbury, for the repair of the chapel, which met with the approval of the committee, and Mr. Whins was prepared to complete the work for 120*l.* The visit of the society to Ashchurch in May, 1885, had led to the proposed restoration of the very interesting village cross, fragments of which were scattered here and there. The cross, when restored, would be about 13 ft. 6 in. high. It was certain that many Gloucestershire village and churchyard crosses, besides those which Mr. Pooley had somewhat imperfectly delineated and described in the "Old Crosses of Gloucestershire," were still extant, and it was to be desired that the example set by the inhabitants of Ashchurch might be followed elsewhere. The Ancient Monuments Protection Act, 1882, had given facilities which it would be well for the society to avail itself of. The schedule of the monuments brought under the Act might be considerably enlarged in Gloucestershire, and it was hoped that owners of property on which there were such monuments would hasten to place them under the guardianship of the Commissioner of Works.

The Rev. S. Davis proposed, and Mr. Falconer Madan seconded, the adoption of the report, which was carried, and other business having been transacted, Sir Henry Barkly took the chair, and delivered his presidential address, which was entitled "The Early History of Dursley."

The company after luncheon reassembled in the parish church of St. James, where they were received by the rector, the Rev. Canon Madan, M.A., who read a paper upon the history of the building.

Under the guidance of the Rev. C. C. Murray-Browne, M.A., and the Rev. W. R. Lett, the party next proceeded to the celebrated Broad well (or Ewelme), which attracted considerable attention. The ancient building adjoining, known as the Nunnery, was also inspected, after which a visit was made to the Priory at the bottom of the town, a house supposed to have been built about 1500, and which is in a good state of preservation. A remarkable fire-place here attracted much attention. By way of Long-street the party then proceeded to the supposed site of the old Dursley Castle, under the guidance of Gen. Vizard and the general secretary.

The annual dinner of the society took place at the Old Bell hotel in the evening. A temporary museum for the exhibition of local and other antiquities was opened in the Town-hall.

At the evening meeting the following papers were read:—"The Decay of the Clothworkers," by the Rev. C. C. Murray-Browne; "Notes on the Town and Neighbourhood of Dursley," by Mr. F. Madan; and "Kingswood Abbey," by Mr. V. Perkins.

On Wednesday morning a large party started from Dursley Town-hall for their first carriage excursion in the direction of Tetbury, through some beautiful country. After passing Kingscote, the first object of interest inspected was Calcot Barn, which was described by the Rev. A. K. Cornwall. The Calcot Barn was built by the Abbot of Kingswood, in the reign of Edward I. Within the doors was a bas-relief called "Balaam and his Ass." Bigland's MS. referred to the barn as being 130 ft. long, and as being capable of holding 900 loads of corn. The visitors then drove on to the old castle of Beverstone, where the general secretary (Rev. W. Bazeley) read a brief paper on its history. The excursion arrived at Tetbury at one o'clock, where, after a luncheon, the town-hall, the church, and the ruins of the old abbey were inspected.

SOMERSET ARCHÆOLOGICAL SOCIETY.

On Tuesday, the annual meeting of the Somerset Archæological Society commenced at Yeovil. There was a large and distinguished company present; but the President, Lord Carlingford, was prevented by ill-health from attending. On the motion of the Right Rev. Bishop Hobhouse, Mr. John Batten, of Aldon, was elected President for the ensuing year. The President-elect thanked the members for the honour conferred on him. Mr. Green then read the thirty-eighth annual report of the Council. We quote a few passages:—"The steady increase in the number of its members, amounting at the present time to 520, is a proof that the society continues to receive a cordial support. The state of the finances, although apparently not so favourable as that shown in the last report, is sound and satisfactory. The balance in the hands of the treasurer at the close of 1885 was 9*l.* 9s. 11d., as compared with 76*l.* 10s. 11d. at the close of 1884. But this diminution is owing to the fact that the 'extra expenses incurred in re-arranging the contents of the Geological Room, and in painting and fitting up the Ethnological Room,' announced in the last year's report, have been paid out of this year's income. The liability on the Castle Purchase Fund now amounts to 311*l.* 16s. 7d. To this must be added the deficit incurred in the reconstruction of the Geological Room, viz., 258*l.* 0s. 7d., making the total debt 569*l.* 17s. 2d., as compared with 653*l.* 13s. 9d. at the end of 1884. Your Council, considering that the library has recently become of sufficient importance to warrant them in extending its usefulness, appointed a sub-committee to draw up a scheme for the loan of books to members, and also to prepare a catalogue of the rules. The rules suggested by them are appended hereto. . . . . It is with sincere regret that your Council refer to the recent death of two of the society's most valued members, the Rev. F. Brown and Mr. Wm. Long. Mr. Brown, who for a short time was one of the society's hon. secretaries, had made the genealogies of the county of Somerset his special study, and by his extensive and accurate knowledge of them, often enlivened by touches of anecdote, contributed much to the society's excursions, and furnished many valuable papers to its volumes. Mr. Long was president of the society in the year 1869."

The report and accounts having been adopted, the vice-presidents were appointed, the name of the Right Hon. Lord Carlingford being added to the list. The other officers were re-elected, and the name of the Rev. Prebendary Buller, of Chard, added to the list of local secretaries. A local committee was also appointed, and about twenty new members elected.

Mr. Green drew attention to the fact that Taunton Grammar School had been advertised by the Charity Commissioners for sale at only eighteen days' notice. The announcement had caused some consternation, and it was suggested that the Society should take some action upon the matter. Mr. Bourdillon said the date of the school was 1522. In the course of a conversation it was suggested that an effort should be made to interest some Taunton friends in the matter, with the view, if possible, of getting the sale postponed. Mr. Bourdillon said if the school buildings were destroyed it would be a scandal to the whole neighbourhood. He thought the Society ought not to sit quietly still under the circumstances. He moved that the Society memorialise the Charity Commissioners to postpone the sale in order that steps might be taken to save the building, or at least to prevent it from falling into improper hands. Bishop Hobhouse seconded, suggesting that they should merely ask that the sale should be postponed. The resolution was amended, and the chairman, in putting the resolution, expressed the hope that the Taunton people would bestir themselves in the matter. The motion was carried.

The President then delivered his address, which dealt with the principal historical features of the town of Yeovil. It was listened to with the greatest attention, and was well received.

After the meeting the members and others assembled visited the Old Timber inn, the Chantry-house, and Yeovil church. Carriages were then provided, and the company were conveyed to Aldon, where luncheon was supplied by the President. After luncheon the society visited Brympton church and house, a description of which was given by Mr. Chisholm Batten; and then drove to Preston, to examine the Mediæval house and barn; through Ilchester, to Limington, Ashington, and Mudford, and back to Yeovil for the evening meeting.

On Wednesday the society visited Odcombe.

SUPERINTENDING ARCHITECT, METROPOLITAN BOARD OF WORKS.

Sir,—As you well point out, none of the candidates for the appointment would fill Mr. Vulliamy's shoes. Is not the failure due to the extremely short notice given,—less than a week,—leading many architects to suppose that it was a purely formal announcement, and therefore hardly worth while making an application which would involve troubling others for testimonials, &c. If it really be an "open event," why not start again after the recess? The Board would then find they had no lack of good candidates. Above Board.

*** We notice on the *agenda* for this week's meeting of the Board that the Works and General Purposes Committee have resolved to recommend to the Board "That Mr. George Vulliamy be appointed Superintending Architect for a further period of three months, namely, from the 29th of September until the 25th of December next."

PRESSURE IN WATERPIPES.

Sir,—Can any of your correspondents give me the formula for ascertaining the pressure to which 24-inch pipes would be subjected? The entire length is 1,500 yards. The outlet is sometimes 16 ft. below the surface of the water; the intake or upper end is 8 ft. above the highest level of water at the outlet. There are two vent pipes in the first hundred yards, and two at the second hundred yards, each 10-in. bore. The fall of pipes is uniform. Can there be any holding up of the water by the air inside? If so, for how long, and what pressure would overcome it? M. A. R.

PROVINCIAL NEWS.

Bath.—The corner stone of the new baths was laid on the 23rd ult. The *Bath Chronicle* says that the stone is laid directly on the colossal masonry of the ancient baths, which has stood 15 ft. or 16 ft. above the ground, and forms the southern boundary of the King's Bath. Mr. Wilkinson having spread the mortar, the stone was lowered to its bed, and declared to have been well and truly laid. The conventional bottle containing records and coins was dispensed with, but the ceremonial is duly recorded on the face of the stone in the following inscription:—

On July 23, 1886,
Under the Mayoralty of Anthony Hammond,
The Hot Mineral Baths Committee
(J. J. Wilkinson, Chairman)
Have laid on Roman Masonry Seventeen
Hundred Years old the Corner Stone
Of new Baths,
Thus connecting in Work and
Object the Modern with the Ancient World.

The Committee, noticing an important omission from the inscription, the name of the architect (Mr. Davis, the City Architect), a formal resolution was passed directing that it should be supplied. The builder is Mr. J. Long.

Douglas (*Isle of Man*).—The foundation-stone of a new hospital and dispensary for the Isle of Man was laid in Douglas a few days ago, by Mrs. H. B. Noble, who, with Mr. Noble, has given the site and 5,000*l.* for the erection of the building. The new hospital is in a commanding and elevated position, and will be called "Noble's Isle of Man Hospital." Accommodation will be provided for fourteen male and fourteen female patients in the general wards

and there will be accommodation also for four patients in smaller wards, and private wards will be likewise provided. The building will be faced with red pressed bricks and terra-cotta dressings, from the works of Mr. J. C. Edwards, of Ruabon, and the contract is being carried out by the executors of the late William Gradwell, of Barrow-in-Furness, for the sum of 4,038*l.*, from plans and designs made by and under the superintendence of Messrs. Bleakley & Cubbon, architects, Birkenhead.

Edenbridge (*Kent*).—The new Odd Fellows' Hall at Edenbridge has been opened. It has been erected at a cost of about 1,200*l.* by the members themselves, many of them being connected with different branches of the building trades. Mr. W. S. Fox is the architect.

Exeter.—On the 29th ult., the Mayor of Exeter formally opened the Belmont Pleasure-grounds, St. Sidwells, which are five acres in extent. They were lately acquired by the Municipality of Exeter from Mr. Huxtable. The grounds will be a great acquisition to the inhabitants of this part of Exeter, as Mr. Councillor Harry Hems, Chairman of the Public Grounds Committee, well pointed out on the occasion of the opening ceremony.

Hartlepool.—The foundation-stone of a much-needed improvement, the Hartlepool Headland Protection, was laid by the Mayor (Mr. James Rawlings, J.P.) on the 2nd inst. The wall commences at the Corporation-road and terminates at the Lighthouse, having a length of 3,400 ft. In addition to protecting the face of the cliff from the inroads of the sea, the scheme includes the reclamation of about three acres of land and the construction of a promenade, which will measure 20 ft. at the narrowest part. The top of the wall will be 18 ft. above high-water mark, and the cliff between this and the Moor level will be terraced, the promenade asphalted and protected by iron railings, thus forming one of the finest marine promenades in the country. Near to the Heugh Battery, where a large area of ground is reclaimed, it is proposed to place a sea-water swimming-bath, with penstocks so that the water can be renewed each tide. At intervals inclines are to be constructed, placing the foreshore and Moor in communication. The wall is to be constructed of concrete blocks, varying in size, and will weigh from three to five tons each. The foundation blocks which are let into the limestone rock will be protected by an apron. The contract was signed by Mr. T. A. Matthews, Bolton, on the 27th of January last, his tender being 23,319*l.*, and the interval has been occupied in laying down a railway and making blocks. Mr. H. Mair is the engineer for the work, and it is being carried out under his superintendence.

Hull.—At a meeting of the special committee appointed to deal with the resignation of the Borough Engineer of Hull, Alderman Leake in the chair, the ten candidates selected at the previous meeting attended and stated their qualifications. The following gentlemen were selected to appear before the Town Council for final selection:—W. Harpur, Borough Engineer, Cardiff; E. J. Mawbey, Borough Engineer, King's Lynn; J. Stafford, Borough Engineer, Burnley; A. G. E. Thoms, Borough Surveyor, Wolverhampton; A. E. White, Assistant Borough Engineer, Hull; J. F. Worth, Borough Engineer, Burslem.—Alderman Stuart moved, and Sir A. K. Rollit, M.P., seconded, "That having seen the ten selected candidates, and being of opinion that none of them possess qualifications superior to those of Mr. White, Hull, it be a recommendation to the Council to offer Mr. White the appointment at 400*l.* per annum." Eight voted for the resolution and six against, and it was carried. The salary offered in the advertisement was 500*l.* per ann.

Keymer (*Sussex*).—The new railway station at Keymer, on the Brighton main line, is now opened. It is situated about 150 yards north of the old station, and close to the World's End Arch. The line runs considerably above the natural level of the earth, and consequently a large expenditure has had to be incurred in banking up for the new station. The station is approached on either side by long flights of steps. The ticket-office is on the east side, and communication between the platforms will be established by means of a short subway. The ticket-office is below the level of the platforms, and is built of pitch-pine, painted stone colour with chocolate decorations. The platforms are of great length, and are built on the standard height introduced by Mr. Stroudley. The facings are of brick and the surface chiefly of gravel. The contractors were Messrs. Longley & Sons, of Crawley, and the building of the station was superintended by Mr. Jones, of Brighton.

Kingston-on-Thames.—The building known as the Old Grammar School (but really the Free Chapel of St. Mary Magdalen, built by John Lovekyn in the middle of the fourteenth century) has been re-opened for use as a school-room in connexion with the Grammar School. Owing to the removal of the adjacent schoolhouse, and the decay of the external stonework, the building was in a dilapidated and dangerous condition, and required extensive repairs, which have been executed by Messrs. Oldridge & Sons, under the supervision of Mr. A. J. Style, A.R.I.B.A. The chapel is internally about 38 ft. by 17 ft., with windows at both ends and at the sides, and octagonal turrets at the eastern angles. It is built of flint and chalk, with dressings, &c., of Surrey fire-stone. Great care has been taken to preserve the original stonework, and the stones used for the repairs to the windows, &c., was procured from quarries near Reigate. The Surrey Archæological Society have taken active steps for the preservation of this building, and a very complete history of the chapel and its founders has been written by Major Heales, F.S.A. The cost of the repairs to the chapel and the class-rooms, and erection of boundary walls, &c., amounted to more than 600*l.*, which has been raised entirely by voluntary contributions through the energy of Mr. Guilford, of Surbiton, the chairman of the Governors of the Endowed Schools.

Newcastle-under-Lyme.—The memorial stones of a new Temperance Hall here have been laid. It is proposed to erect the hall, as high as the first floor, of blue bricks with stone dressings, the basement being occupied with rooms for committee and lodge meetings, kitchen accommodation for tea meetings, &c. Above this will be erected an iron building, which has recently been used as a church. This building is 68 ft. long and 33 ft. 6 in. wide, and will accommodate from 500 to 600 persons. It will have a bell-turret and porch at the front in Bridge-street, and the interior will be fitted up and seated in pitch pine. Mr. E. Jones, architect, will superintend the erection of the hall; the contractors being Mr. Whitehouse, of Silverdale, for the brickwork; Mr. Rhodes, of Newcastle, for the stonework; and Mr. J. Bennett, of Newcastle, for the woodwork. The total cost will be about 450*l.*

Ramsey (*Isle of Man*).—A new landing-pier has just been opened at Ramsey. It has been erected by Messrs. Head, Wrightson, & Co., of Stockton-on-Tees, under the direction of Mr. Routledge, their resident manager at that port. The plans were prepared by Sir John Coode, and were carried out under the superintendence of Mr. James Walker, resident engineer on the island under the Harbour Commissioners. The abutment of the pier, which was constructed by Mr. John Looney, is of great strength, and is composed of dressed stone, capped with Port St. Mary limestone, and the bulwark is a solid mass of concrete and large quarried stones laid on edge. There is a strong open grating of iron over the bulwark, so as to allow heavy seas to pass through at high water, without inflicting any injury to the deck of the pier. The columns in the open part of the pier are built of sectional wrought iron, and are hollow. They have been screwed into the clay to a depth of about 15 ft., by hydraulic pressure, and are strutted with double T-iron struts, and are tied with 2¼-in. tie-rods, with right and left handed unions on the rods. The columns are capped with heavy cast-iron caps, forming a bed for the girders, which are built on the lattice principle, on a span of 40 ft. each. The centre girders are stronger than the others, being double-plated at the top and bottom, the increased strength being requisite in order to sustain the weight of the tramway which will run along the middle of the deck. There are forty-nine of these spans, of 40 ft. each, and in addition there are six spans of 20 ft. each, which form the stiffening bars, and are 18 ft. wider than the other portion of the pier, which is 20 ft. wide. The open work extends seawards a distance of 1,880 ft., and at the outer end is a semi-solid work, of 280 ft., which gives a total length of 2,160 ft., or 720 yards,—only 160 yards short of half a mile. The semi-solid head is composed of six rows of sectional columns abreast, similar to those in the open-work, but of heavier material, and constructed on the same system.

Rotherham.—The first or north-east corner stone of the new ward of the Rotherham Hospital and Dispensary has just been laid with Masonic ceremonial. The addition consists of a centre ward situate on the south side of the present building, and gives accommodation for twenty additional beds. The floor will be of polished oak, and the walls plastered for painting, with open-timbered roof. Ventilation is provided by Sheringham's inlet ventilators and Boyle's extractors. The walling is to be of Thrybergh stone, and the roofs will be covered with blue slates. The work, which is estimated to cost 1,000*l.*, is being carried out by Mr. W. Seiles, contractor, of Rotherham, from the plans and under the supervision of Mr. H. L. Tacon, architect and surveyor, Rotherham.

Scarborough.—A few days since Mr. Arnold Taylor, one of the Inspectors of the Local Government Board, held an inquiry at the Town Hall, Scarborough, to consider the application of the Town Council for sanction to borrow 27,000*l.* for constructing a sea wall and marine drive, and 1,100*l.* for public walks and pleasure grounds. The Town Clerk (Mr. G. Dippie) explained the application for the loan of 27,000*l.* for the North Cliff Improvement, and reminded the inspector that a provisional order had been granted in 1883, enabling the Corporation to purchase the North Cliff land and lay it out in pleasure grounds. That order was granted after inquiry by Mr. Taylor himself, and he would remember that one of the grounds of the application was that as a large portion of the cliff had fallen down and endangered the Blenheim-road, the Corporation then had deemed it necessary to purchase the whole of the cliff. Eventually it was done at a cost of 3,700*l.*, but the purchase had been a good deal delayed, as well as the carrying out of the works, from the fact that the Scarborough and Whitby Railway Company contemplated making a railway and tunnel through the cliff. That had been abandoned, and what the Corporation now wanted was to carry out the works of the sea wall, &c., which had been so delayed. Mr. Dippie then explained what course had been taken by the Corporation, and the petitions presented urging them to carry out the long delayed work, and he also referred to the plans prepared by Sir John Coode for constructing a sea wall and public promenade, including the North Cliff, and passing round the Castle Cliff, and said that the plan now proposed and for which the loan was asked, was part of that scheme. In February last, the matter was again before the Council, and it was unanimously resolved to go on with the work, and subsequently Mr. Elliott, engineer, was engaged to prepare the necessary plans. Up to this time no memorial or opposition had been presented or offered on the part of the South Cliff people, but at a subsequent meeting a deputation from the South Cliff ratepayers attended, and presented a memorial praying that the time was inexpedient to carry out works involving so great an expenditure. Subsequently amendments were proposed in the Council, but negatived by a large majority. Mr. Dippie concluded by stating that the Corporation had for a long time contemplated this work on account of its necessity, from the wearing away of the cliff by the action of the sea, and the Borough Engineer would show how much had been washed away during recent years. He added that the work would not be a burden to the town, as they had power to borrow double the amount of their rateable value, which was 163,000*l.*, and their indebtedness was only 75,000*l.*

Stratford-on-Avon.—At the quarterly meeting of the Town Council, held on the 3rd inst., the Sanitary and Highways Committee produced a detailed report from a sub-committee recommending that the work of laying out the Bancroft property, near the Memorial Theatre, should be proceeded with, the estimated cost being 900*l.* The work comprises the pulling down of the old buildings at present standing on the property, and the laying out of the grounds as a place of public recreation, the details of the manner in which it will be done to be decided later on. The time named for the completion of the undertaking is November of next year.

Staines.—The pumping-engines at the Staines Waterworks have been duplicated by Messrs. Merryweather & Sons, the machinery consisting of horizontal 30-horse boilers, with engine and pair of improved deep-well pumps.

CHURCH-BUILDING NEWS.

Dalby.—Dalby Church, near Terrington, was re-opened by the Archbishop of York on the 26th ult., after restoration, prior to which it was in a very damp and neglected condition. The massive chancel walls have embattled parapets, strong buttresses, and a barrel-vaulted stone roof. The other roofs are plain, and were covered with red tiles (now replaced with Welsh slates), which gave to the building a most uninviting appearance. A new south porch of open timber work has been erected, and a new stone bell gable at the west end, and the interior of the church has been refitted with new doors, open pitch-pine seats, new pulpit, reading-desk, and reredos. The work has cost over 300*l.* The architects were Messrs. Demain & Brierley, York. The contractors were Mr. Wood, mason, Skewsby; Messrs. Lacy & Son, carpenters, Skewsby; Messrs. Reid & Sons, joiners, Leeds; and Mr. Geo. Hodgson, plumber and glazier, Hovingham.

Easton (Bristol).—A site for the new church in the proposed new district of St. Thomas the Apostle, Eastville, has been secured through the generosity of a member of the committee. The church is intended to serve for a population of 5,500, of whom nearly 5,000 will be taken out of the parish of St. Mark, Easton, and the remainder out of the parish of Fishponds. The district will embrace also a small portion of the parish of Stapleton. It is proposed to build a church accommodating 780 persons, the estimated cost of which, according to the plans prepared by Mr. H. C. M. Hirst, architect to the committee, will be about 6,000*l.* This is to be carried out in two sections, the former of which is estimated to cost 3,800*l.*, and to contain accommodation for 430 persons.

Fairford.—On the 29th ult. a vestry meeting was held to take into consideration the state of the church roof, more especially with reference to that of the nave. The vicar explained that during the process of "cobwebbing" the roof it was discovered that one of the rafters was loose, and upon closer observation symptoms were discovered which, in the opinion of the vicar and churchwardens, called for a closer examination. Having called the trustees of the church lands charity into consultation, it was determined to ask Mr. Baldwin, builder, to make a survey, and he, after a most careful examination, made a report, which was to the effect that practically little short of a new roof was required. Mr. Baldwin produced a rough sketch, showing what parts of the roof were most decayed, namely, the ridge and some of the principals. Some two or three of the rafters which were taken down were also produced; they were in a state of decay amounting to rottenness. Ultimately a committee was appointed to further consider the matter. The *Wilts and Gloucestershire Standard*, from whose columns we extract these particulars, does not make mention of any architect having been consulted in the matter.

Good Easter.—The parish church of Good Easter, which was nearly destroyed by a fire on Sunday, March 22nd, 1885, has just been re-opened by the Bishop of Colchester. So much damage was done by the fire that, practically, a new church had to be built. Not much time was allowed to elapse after the catastrophe before Mr. F. Chancellor, architect, Chelmsford, was commissioned to get out plans, and the tender of Mr. Walter Letch, builder, of Braintree, for 1,850*l.* was accepted. The plans included a new oak tower and spire, with a total height of 109 ft., a new open-timbered roof to the nave and south aisle, a new west wall, and the restoration of the south porch. The chancel was re-tiled, the plaster was taken off outside, and the interior had to be entirely renovated. The old character of the tower and spire have been adhered to, except that the spire has been covered with oak shingles instead of boarding. Messrs. Warner have recast and rehung the three bells. The church is now heated by one of Porritt's apparatus. While the work of the church was in progress two arches were discovered and opened out on either side of the present chancel arch, and in one of them some old painting is discernible. The total cost of the restoration was about 2,300*l.*

Kennington.—A new pulpit has just been erected in the Church of St. John the Divine, Kennington, which was built some years since from the designs of the late Mr. Street. The pulpit, which, including the pedestal upon which it stands, is entirely of oak, was designed by Mr. Hunt, of Upper Baker-street. It is octagonal in plan, the several panels being elaborately carved with full-length figures of the twelve Apostles, arranged in pairs, at the top and bottom of each angle. On the south side, at the top, is St. Peter carrying the keys, and below him is St. Andrew. In the next division at the top is St. James the Great, represented as a pilgrim with a staff, and below him St. John, represented as holding the chalice and eagle. In the adjoining divisions, in front of the pulpit, are St. Philip bearing a cross, St. Bartholomew, St. Thomas, and St. Matthew. In the divisions on the north side are figures of St. James the Less, St. Jude, St. Simon, and St. Matthias. In the panels which form the background of the pulpit, and beneath the octagonal canopy, are figures representing the four great doctors of the Latin Church. On the north side, at the top, is St. Jerome, and beneath him St. Augustine, carrying a pastoral staff and wearing a mitre; and on the south side, at the top, is St. Gregory the Great, carrying a book in the right hand and a crozier in the left, and below him is St. Ambrose of Milan, wearing a mitre. The work has been carried out by Mr. Robinson, of Bloomsbury.

Middleton (Yorks).—A few days since, the Archbishop of York re-opened the parish church of Middleton, near Pickering, one of the oldest and most commodious village churches in the district. The restoration included both the exterior and interior of the church. The work began, we believe, in 1884, and at first was mainly directed to the nave and the exterior. Up to 1884 the church was very damp, and had become dilapidated in places, hence a most important improvement was first effected in taking up the old pavement, clearing out the wet soil, and putting in a layer of concrete. A solid wood block flooring was laid within the stalls, and neat stone-paving in the passage-ways. New oaken seats have replaced the old ones, and in this particular care has been taken to match the four fourteenth-century stalls, which have been retained in the chancel. The arch dividing the nave and chancel was rebuilt, the tower arch repaired and cleansed, the fine south doorway restored, and other internal work was done to the nave, the restoration of which was kept almost separate from that of the chancel, in order to interfere as little as possible with the services in church. The chancel was the last feature restored, and Mr. C. Hodgson-Fowler, of Durham, the architect, has given particular attention to this section of the restoration, as the old chancel had been altered, subsequent to the year 1600, to a form not at all in keeping with the original style. Some of the walls were also in very bad condition, the roof decayed, and the basements damp, hence it was determined to raze and rebuild the chancel completely. This has just been done to a new design in the Late Decorated style. The new roof is of oak, double-boarded for warmth, and is covered with Westmoreland slates. The floor has been treated in the same manner as the floor of the nave, and is now dry and comfortable. New seats and desks of oak have also been inserted. The cost of the whole restoration has been about 1,700*l.* The contractor for the earlier works was the late Mr. T. Wood, of Pickering; for the chancel, &c. Messrs. Dennison, of York, and Messrs. Brown & Oldfield, builders, of Malton. Mr. C. Hodgson-Fowler, F.S.A., of Durham, was the architect.

Rodmersham.—An oak reredos has recently been erected in Rodmersham Parish Church. In design it harmonises with the oak sedilia, parclose, and chancel screens, for which this church is noted. The sedilia are of fourteenth-century work, with a baldachino or crested canopy, and the principal features of the new reredos are a central projecting canopy or baldachino, based on the lines of the old sedilia, with foliated gablet in front, terminating with a bold carved final and a carved returned cornice, surmounted by brattishing on each side of the gablet. The work has been executed by Messrs. Jones & Willis, at their Birmingham works, from the designs of Mr. W. Leonard Grant, architect, of Sittingbourne.

Stafford.—An effort is now being made to complete the restoration of St. Chad's Church, Stafford, by building the north transept. The architect is Mr. R. Griffiths, who has prepared plans on the line laid down by Sir Gilbert Scott, and the work is being rapidly pushed forward so as to be finished by All Saints' Day, November 1st. During the excavation, an old wall was found running the whole length of the tower, which (says the *Staffordshire Advertiser*) proves almost without doubt that there was a transept originally. The new transept will be Norman in character, and will be connected with the choir with a Decorated arch, similar to the one at the entrance to the chancel; there will also be another entrance to the church from St. Chad's-passage, which will be a great convenience. The work is in the hands of Messrs. Lowe & Sons, of Burton-on-Trent. There will be accommodation for sixty-seven people, and the whole cost of the work will probably be about 700*l.*

Weymouth.—The corner stone of the new aisle of Holy Trinity Church, Weymouth, has been laid by Mrs. Wordsworth. The architects are Messrs. Crickmay & Son, the builder being Mr. A. Clarke.

DISSENTING CHURCH-BUILDING NEWS.

Beverley.—On the 3rd inst. the foundation-stone of a new Congregational Chapel was laid at Beverley, by Mr. Edward Crossley, M.P., of Halifax. The new building is to occupy the site of a chapel just taken down. It will accommodate about 500 people, and the design is Decorated Gothic in style. The material will be of red brick, with Ancaster stone dressings. Mr. B. Thompson, of Hull, is the architect, and Mr. R. Potts, of Beverley, the builder.

Burton-on-Trent.—On the 24th ult. the memorial stones of a new Baptist Chapel in Derby-street were laid. The plans have been prepared by Mr. A. T. Greening, architect, Birmingham, and a contract has been signed with Mr. H. C. Mellors, of the Borough-road, to execute the work, the price being about 1,800*l.* The chapel will be about 55 ft. long by 38 ft. wide, and a gallery will be carried round the two sides and front end of the building, accommodation being provided for 600 people. The building will be of brick with Bath stone dressings.

Eastbourne.—The new Baptist Chapel in Ceylon-place has been opened. It is built of red brick with stone dressings, and provides accommodation for 660 persons. Mr. J. Wills, of Derby, is the architect. The cost of the building has been 4,000*l.*

STAINED GLASS.

Ripon Cathedral.—Last week Messrs. Burlison & Grylls, of London, commenced the insertion of a new west window in Ripon Cathedral. Those who are familiar with the interior of the cathedral know that though a large sum was spent in inserting the present geometrical tracery in the west window, its effect was scarcely noticeable, and there has long been a desire to fully complete the cathedral restoration by placing in the west window a prominent Scriptural subject. The window now being fixed will commemorate the two late Bishops of Ripon,—Archbishop Longley and Bishop Bickersteth, and will consist of two tiers, each containing five lights. In the lower tier the parable of the wise and foolish virgins is represented as follows:—In the south side light the ten virgins are seen sleeping. The north side light represents their awakening: the five foolish virgins, who were surprised, eagerly asking for oil. In the adjoining light on the north, the five foolish virgins are going to buy oil, while correspondingly on the south side the wise virgins are setting out to meet the Bridegroom. In the centre the striking scene of the closed door, and the despair of the foolish virgins, is forcibly represented. In the higher portion of the three central lights in this tier are seen the bridal party going into the feast; the bridegroom going to the bride and marriage feast. In the upper portion of the central of the higher tier of lights our Lord is represented in majesty, while in the two lights on each side are angels with musical instruments. The middle portion of the three central lights is devoted to "The Queen in gold of Ophir," "The Archangel St. Michael with trumpet," and "The daughter offering with the rich their gifts." The lower portion of these lights is filled with companies of faithful worshippers. In the south-side light "the blessed" are represented "entering the Heavenly City," while on the north "the wicked" are seen "driven away by angels."

St. Giles's Cathedral, Edinburgh.—The Bruce memorial window, which has just been placed in the west end of the nave of St. Giles's, is a very marked addition to the decoration of the cathedral. It is by Cottier, of London. The subject of the window is "The Prophets,"—"These are the prophets of whom our fathers spake," as is inscribed on a scroll in old English characters. The window has five lights with a transom in the centre, giving ten compartments, in each of which the counterfeit presentment of a prophet is placed. The tracery above has been filled in with prophetic emblems,—such as Ezekiel's wheel, &c. Reading from south to north, there appear in the upper compartments of the window, Isaiah, Jeremiah, David, Ezekiel, and Daniel; and in the lower set, Amos, Jonah, Elijah, Zechariah, and Malachi. In the faces and habiliments of the figures something of the characteristics of the several prophets mentioned have been reproduced. The Shepherd King, attired in royal robes, plays on his harp; Jeremiah, in sombre raiment, laments over Israel; while the herdman of Tekoa appears in peasant's costume, and carries in his hand a shepherd's crook. The figures are about 7 ft. in height. An inscription disposed along the pedestals on which the lower figures stand tells that the window is "In memory of Fanny, wife of R. T. Hamilton Bruce, and daughter of John Bruce. Died 8th August, 1881; aged 24."

The Student's Column.

STONE QUARRIES.—VI.

DEVON AND CORNWALL GRANITES.

THE granite quarries which we propose first to describe are those situated in Devon and Cornwall.

Granite has been used in Cornwall from time immemorial for building and monumental purposes, but the process of raising it from quarries is of recent origin. Until within the last sixty years the only granite used was obtained from boulders upon the surface of the ground; but for all export purposes at least, quarrying has entirely superseded this primitive method, and is now a prominent industry in the county. The quarries produce very large blocks, whilst the fact that both fine and coarse grained granites are obtained is sufficient to render it capable of being used for either architectural or engineering work.

We may remark, however, that the vast majority of the granites of Devon and Cornwall are coarse-grained, with large felspar crystals scattered throughout, and that fine-grained varieties are not so common as in some of the other districts to be described. Haughton has shown that some of the white mica of the Cornish granites is lepidolite (lithia mica), whilst the black mica in the same rocks is often lepidomelane (iron-potash mica).*

The principal granite quarry-owners in the districts under consideration are Messrs. John Freeman & Sons, of Penryn, and we are indebted to Mr. Wm. Geo. Freeman, of that firm, for much valuable information respecting the quarries, and also for placing a number of samples from the principal quarries at our disposal, for examination. This firm alone has upwards of sixty quarries in Cornwall, situated principally in the large district near Penryn, embracing the parishes of Mabe, Stithians, Constantine, and Wendron; also in Penzance, Luxullian, and in the district north of Liskeard. There are shipping-places at Penzance, Penryn, Port Navas on the Helford river, Par Harbour, and Looe. In these quarries rocks weighing from 100 to 2,000 tons in solid masses, are frequently detached from their native position. The process of quarrying has gradually developed from the most primitive methods, until now, steam cranes, rock-drills, and other labour-saving appliances are in use.

The granite areas of Cornwall and Devon may be conveniently divided into five districts, and a glance at the following map will show their position, and the names we propose to call them.

Several patches of granite which are detached from these main masses need not here be taken into account, and any quarries in them will be referred to the nearest main mass.

1. *Dartmoor District.*

The great mass of granite in this district is coarse-grained, having quartz, felspar, and mica, the last mineral being sometimes white, at others black, and occasionally they are found together. The stone is very frequently porphyritic, and here and there schorlaceous,* but the latter character is chiefly confined to the outskirts where the granite adjoins the metamorphic rocks. Schorlaceous granite, however, is occasionally found in the interior of the mass, and there is a very gradual passage between schorl-rock (schorl and quartz) and ordinary granite, in some parts. As a rule, the mica disappears as the schorl becomes abundant. Rarely, the rocks are composed of quartz, felspar, mica, and schorl in about equal proportions. After the mica has disappeared, the felspar generally goes. The mass is much more variable in composition at its outskirts than anywhere else.

The following are some of the granite workings of the district, about which we have gleaned information.

Trowlesworthy Quarry. — This quarry is situated in the western part of Dartmoor, and is worked by Messrs. John Freeman & Sons. The stone is of a red colour, being the only "red" granite we know of, in any quantity, in the south-west of England.

Its rather inaccessible position, and the irregularity of the structure of the rock, render its introduction into the market on a large scale impracticable, but it is a very beautiful stone.

Haytor Quarries.—These are situated about fourteen miles south-west from Exeter, and are worked by Messrs. J. Easton & Son, of that city.

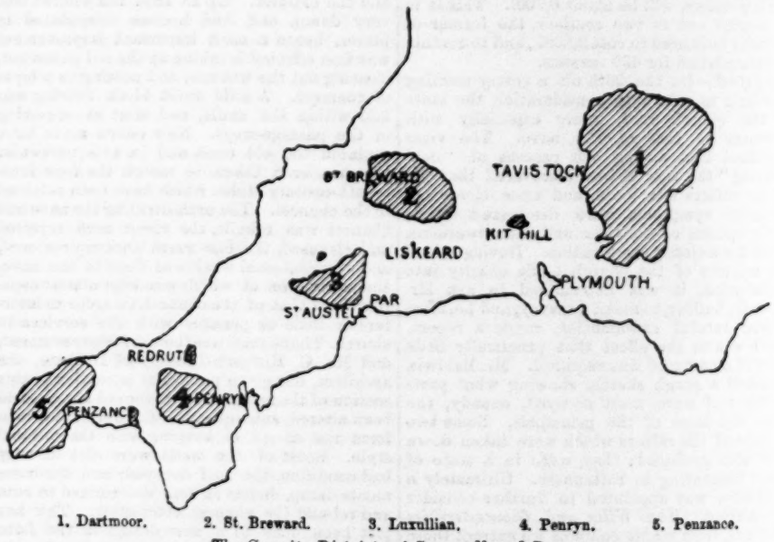
A large portion of London Bridge was built of it, and in those days the granite was shipped at Teignmouth, being carried thither on a granite tramway for five miles to a small canal, whence barges conveyed it to the ships.

We may call attention to the fact that at least two or three authors state that the Haytor quarries have ceased working,* and although the stone is not worked as extensively as formerly, it is incorrect to state that they are closed.

Blackenstone Quarry.—This quarry is near Moreton Hampstead, about eleven miles west of Exeter, and has been worked by Messrs. J. Easton & Son for forty years. The stone has a fine base, composed of felspar, of two colours, light pink and light green. The proportion of quartz does not appear to be very large; black mica is fairly abundant, being scattered about rather evenly. But the character of the stone is chiefly marked by the large porphyritic orthoclase felspars, of a light pink colour. In some cases these felspars do not appear to be so well defined as in the Haytor stone, occurring rather as patches of a broken-up appearance than clean crystals.

The stone splits easily with wedges, and is worked into copings, kerbs, steps, gate-posts, and rollers.

Foggintor, Great and Little *King Tor*, *Swell Tor*, *Crip Tor*, and *Inga Tor*, are quarries situated on Dartmoor, near Princetown, and worked by Messrs. Pethick Bros., of Plymouth. They are about fourteen miles from Plymouth, the port of shipment, and are connected with the Princetown railway, which runs by a siding direct into the quarries.



1. Dartmoor. 2. St. Breward. 3. Luxullian. 4. Penryn. 5. Penzance.

The Granite Districts of Cornwall and Devon.

The earliest quarrying operations in Dartmoor "Forest" on a large scale were at Haytor, and very large quantities were sent to London by the Haytor Granite Company. The company, after several years abandoned, these workings and removed to Foggintor, near Prince Town where it carried on extensive works and raised large quantities of granite, but eventually wound up some twenty years ago. Since then, however, the quarries have been re-opened, as we have seen.

The stone at Haytor appears to have a fine-grained base, of a light greenish grey colour; the felspar is of two tints, white and light green, being distributed evenly over the stone. Mica is very plentiful, the prevailing colour being black, but it approaches brown in places. The quartz is of the ordinary clear crystalline character. Much of the rock quarried at Haytor is wholly composed as above, but a considerable proportion has, in addition, some fine large orthoclase felspars distributed porphyritically. These spars are frequently 2 in. or 3 in. in length, are white, usually exhibit twining, and seem to lie in some cases approximately in the same direction. Very large stones may be obtained, and some time since, a piece about 45 ft. by 12 ft. by 12 ft. was shifted. It is worked principally for monumental purposes, but may also be utilised for steps, kerbs, &c., being taken to Bovey station, about four miles, and sent by rail to Exeter.

The granite from the Swell Tor quarry is of two colours, grey and blue; the blue appears to be a good hard, compact stone, and is largely used for street work, kerbs, &c.

The breakwater, fort, and defences around Plymouth are built of Dartmoor granite.

Between the Dartmoor and St. Breward districts is a little patch of granite generally known under the name of *Kit Hill*. On it the Kit Hill, Tamar, and Gunnislake quarries are situated, and although nothing very large has been done in the way of raising the stone, yet many people know of it by reason of the circulars issued to the public giving a full account of prospective work. The grain of the rock is fine, and the position of the quarries, near the Tamar, no doubt looks tempting for work and easy carriage; but the uncertain quality, and being so full of joints, has hitherto debarred its extensive use.

2. *St. Breward District.*

The mineralogical composition of this mass is very similar to that of Dartmoor, being principally made of quartz, felspar, and two micas. It is frequently porphyritic, not particularly schorlaceous, though small crystals of schorl are sometimes found, chiefly towards the south. Near St. Clear all four minerals are present.

* Proceedings Royal Society, vol. xvii., p. 209.

* *I.e.*, having schorl (a black mineral) in addition to the three essential minerals.

* See "Guide to Mus. Prac. Geol.," p. 26, quoted in Hull's "Building and Ornam. Stones," p. 35; and Rivington's "Build. Const.," part iii., Materials, p. 18.

The *Cheesewring Quarries* comprise the Cheesewring quarries proper, and Kilmar and Bearah Tor. They are all worked by Messrs. J. Freeman & Sons, on the property of the Duchy of Cornwall, being situated about six miles north of Liskeard. The produce is sent direct to the shipping-port of Looe over the Liskeard and Caradon Railway, which is connected with the quarries.

The stone is coarsely crystalline, each mineral being easily distinguished, and although the orthoclase felspar in places is rather large, the rock cannot be said to be very porphyritic. This mineral is quite white, and some of the more regular crystals exhibit twinning. The micas are black, white, and brown. Of these the first is most abundant. Quartz is clear and transparent.

The compact manner in which the minerals composing this stone are arranged, together with the fact that such large blocks can be obtained, renders it unquestionably one of the best granites for large engineering purposes.

De Lank or Eddystone Quarries. — These are situated near Bodmin, and are worked by Messrs. H. Shearer & Co.

The constituents of the rock are two species of felspar, one orthoclase, the other a triclinic felspar, which exhibit in some cases a somewhat granulated structure. There are two species of mica, biotite (black), and muscovite (silvery white). A large proportion of quartz is present, and here and there a very few exceedingly minute crystals of apatite. The quartzose portions consist of small crystalline grains, and there appears to be little or no hornblende, no pyrites, and magnetite if present is only represented by a few exceedingly minute specks.

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Large blocks are obtained, and the joints are so regular that they require but little blasting to shift them out of their natural position. The resources of the quarries are practically unlimited, and the facility with which the stone can be supplied may be judged by the remarks of Sir James Douglass, Engineer-in-Chief to the Trinity House, in the discussion which took place on the "New Eddystone Lighthouse" (built of De Lank granite) at the Institute of Civil Engineers on the 27th November, 1883, when he pointed out that the granite contractors had completed their work six months within the specified time,—three years.

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Instead of the wooden blocks now in use for street paving, which absorb water and deleterious matter, blocks of compressed paper pulp or similar porous material, impregnated with a compound of coal-dust and oil in suitable proportions, are used. This it is claimed is an important sanitary improvement, as coal-dust prevents decay and prevents the absorption of foul matter, it enters the pores of the blocks, and being of a gritty character, forms an excellent surface, and so liable to be churned into mud as when coal-dust is not used.

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6,831, P. Davies, Stench Traps.—7,477, J. Dalton and E. Heinrich, Nails.—7,866, J. Banks, Door-bolts, Staples, &c.—7,880, J. Armstrong, Water-waste Preventing and Regulating cisterns.—7,886, F. Stokes, Manufacture of Cement.—7,941, J. Hill, Saw-sharpening Apparatus.—7,954, T. Twyford, Water-closet Basins and Flushing same.—7,956, T. Twyford, Water-closet Basins.—8,000, J. and A. Wallwork, Traps or Seals for Drains, &c.—8,087, F. Morgan, Casement Fasteners.—8,120, S. Lowden, Portland Cement.—8,297, R. Adams, Convertible Sliding Window Sashes.—8,323, J. Royle, Clamp for Mitred Joints.—8,372, W. Potter and Others, Hinges and Door-closers.—9,141, J. Gough, Cleaning Chimneys.—6,749, G. Graham, Window-sash Fastener.—6,934, S. Rogers, Saw-sharpening Machine.—7,661, B. Whiting, Window-sash.—7,830, J. Betteley, Sliding Window-sashes.—8,145, W. Smeaton, Sen., Water-closets.—8,146, W. Smeaton, Sen., Flushing Apparatus.—8,295, H. Cunningham, Wood Screws.—8,373, H. Whitaker, Fireproof Construction.—8,558, T. Twyford, Water-closet Basins.—8,560, G. Barlow, Wall Ventilator.—8,565, G. Oulton, Pneumatic Syphon Cistern.—9,279, R. Robinson, Brick-setting Tables.—9,296, F. Maxwell and W. Tuke, Pillars or Columns for Building, &c.

COMPLETE SPECIFICATIONS ACCEPTED.

Open to opposition for two months.

11,230, S. Farmar, Door-bottoms for excluding Draughts, Rain, and Dust.—11,387, J. Colbran, Cooking Ranges.—8,299, H. Hesketh, Mortise Lock Furniture.—6,519, T. Kammerell and R. Edwards, Automatic Flushing Apparatus for Drains, Sewers, Water-closets, &c.—7,772, H. Denne, Window-fastener.—11,420, J. Neild, Portable Extension Ladder.—12,390, J. Armstrong, Building Materials.—8,463, W. Horn, Latches for Doors and Gates.—9,529, J. Radford, Springless Door-latch.

Halifax.—A new high altar has just been erected at St. Marie's R.C. Church, Halifax. The altar has been designed and executed by Mr. J. A. Oor, of Roermond, Holland, and is entirely of Austrian wainscot oak. It is 15 ft. high and 10 ft. wide. The reredos presents on each side a group of carved figures, representing on one side the Nativity of Our Lord and on the other side the Adoration of the Magi. The figures are carved in linden wood, and decorated.

RECENT SALES OF PROPERTY.

ESTATE EXCHANGE REPORT.

JULY 24.

By Wilkinson & Son.

Southend—9 and 10, Cliff Town Parade, freehold ... £1,850

JULY 26.

By A. Booth.

Tottenham Court-road—35 and 37, Grafton-street, freehold ... 4,650

Kingston-on-Thames, Hope-avenue—Fourteen houses, and a plot of land, freehold ... 1,800

By Whitehead & Green.

Whitechapel—14, Leman-street, 31 years, ground-rent 90l. ... 1,050

Hackney—15, 17, and 19, Mare-street, copyhold ... 1,050

By G. F. Jay.

Cold Norton, Essex—Russell's Farm, 14a. 0r. 12p., freehold ... 445

By E. & H. Lumley.

Maidenhead—Two plots of freehold land ... 500

By A. Chancellor.

Richmond-hill—Terrace Cottage, freehold ... 2,000

JULY 27.

By H. Donaldson.

Southwark—25, Richmond-street, 42 years, ground-rent 4l. 10s. ... 220

Old Ford—2 to 8 (even), Hewlett-road, 50 years, ground-rent 15l. ... 700

By Whitehead & Green.

Putney—Ground-rents of 10l., reversion in 51 years ... 280

West Kensington—109 and 110, North End-road, 51 years, ground-rent 16l. ... 750

By Tuplin & Roberts.

Kentish Town—4, Castlecart-street, 35 years, ground-rent 4l. 10s. ... 250

By Chesterton, Galsworthy, & Co.

Stratford-on-Avon—The freehold farm called "Willicote," and 101a. 3r. 2p. ... 4,700

By Debenham, Tewson, & Co.

Paddington—Ground-rents of 91l., term 53 years ... 1,850

Canonbury—Ground-rent of 29l. 10s., a year, term 50 years ... 590

By Driver & Pemberton.

St. Luke's—46, Baffin-street, freehold ... 405

No. 3, Dunmow-street, freehold ... 400

By Woodbatt & Wheeler.

Hendon—Two plots of freehold land ... 200

By C. & E. White.

Kennington—8, Kempsford-road, 40 years, ground-rent 6l. ... 145

Battersea—104 to 112 (even), Livingstone-road, 79 years, ground-rent 27l. 10s. ... 525

Improved ground-rents of 15l., term 75 years ... 250

By H. Rutley.

Chalk Farm—26 and 28, Fernhead-street, freehold ... 1,120

Caledonian-road—Ground-rents of 20l. 12s., term 57 years ... 740

Ground-rents of 12l. 10s., term 63 years ... 260

Ground-rents of 26l. 12s., term 65 years ... 615

Hampstead-road—Ground-rents of 12l., term 38 years ... 230

Kilburn—An improved rental of 46l. 10s., term 79 years ... 1,610

Cavendish-square—An improved rental of 91l., term 13 years ... 240

Hampstead-road—127, Stanhope-street, 18 years, ground-rent 4l. ... 200

Islington—3, Stonefield-terrace, 20 years, ground-rent 5l. ... 225

By Mason, Sprigge.

Norwich—The freehold residence, Rosary House ... 2,750

Dove-street—Two freehold houses with shops ... 210

King-street—The City Cafe, freehold ... 220

Pinnacle-street—Two freehold cottages ... 62

Acle, Bungate—Two freehold houses ... 120

JULY 28.

By G. A. Williamson.

Oxford-street—74, Wells-street, 35 years, ground-rent 20l. ... 455

By A. G. Thomson & Co.

Tottenham Court-road—6, Whitfield-street, copyhold ... 460

Acton—103, Bath Bridge-road, freehold ... 360

Birkbeck-road—A plot of freehold land ... 40

By Baxter, Payne, & Lepper.

Bromley, near—A plot of freehold land ... 310

By Hodgson, Rutkaume, & Co.

Deptford—39 and 40, Wellington-street, freehold ... 460

By Debenham & Martin.

Putney—11, Putney-hill, 33 years, ground-rent 12l. 12s. ... 1,225

No. 108, Upper Richmond-road, freehold ... 320

Ground-rent of 6l. 17s. 6d., reversion in 70 years ... 160

Ground-rent of 25l., reversion in 72 years ... 470

Ground-rent of 82l. 10s., reversion in 50 years ... 2,050

Kentish Town—56 and 58, Weedington-road, 64 years, ground-rent 10l. 10s. ... 270

By A. Rosenberg.

Camberwell-road—No. 68, freehold ... 1,100

By H. & Cox.

Dockhead—34, 36, and 38, Tyrlinger-street, and 20, 22, and 24, Arnold's-place, 21 years, ground-rent 11l. ... 200

Southwark—169 and 171, Drummond-street, 35 years, ground-rent 4l. 10s. ... 460

Bermondsey—7 to 17 (odd), Fort-road, 17 years, ground-rent 19l. 10s. ... 1,210

Nos. 2 to 8 (even), Willow-walk, 21 years, ground-rent 2l. ... 1,020

Nos. 21 and 22, Fream-street, 11 years, ground-rent 6l. ... 175

Nos. 40 to 46 (even), Limeburner-street, 14 years, ground-rent 8l. ... 280

Nos. 92 and 94, Basel-road, 20 years, ground-rent 6l. ... 420

No. 50, Jamaica-road, and 2, Fream-street, 20 years, ground-rent 7l. 5s. ... 495

Nos. 1 to 7 (odd), Tyrlinger-street, and 9, 11, and 13, Limeburner-street, 14 years, ground-rent 18l. ... 425

Nos. 133 and 134, Grange-road, 11 years, ground-rent 10l. ... 710

St. Giles's Cathedral, Edinburgh.—The Bruce memorial window, which has just been placed in the west end of the nave of St. Giles's, is a very marked addition to the decoration of the cathedral. It is by Cottier, of London. The subject of the window is "The Prophets,"—"These are the prophets of whom our fathers spake," as is inscribed on a scroll in old English characters. The window has five lights with a transom in the centre, giving ten compartments, in each of which the counterfeit presentment of a prophet is placed. The tracery above has been filled in with prophetic emblems,—such as Ezekiel's wheel, &c. Reading from south to north, there appear in the upper compartments of the window, Isaiah, Jeremiah, David, Ezekiel, and Daniel; and in the lower set, Amos, Jonah, Elijah, Zechariah, and Malachi. In the faces and habiliments of the figures something of the characteristics of the several prophets mentioned have been reproduced. The Shepherd King, attired in royal robes, plays on his harp; Jeremiah, in sombre raiment, laments over Israel; while the herdman of Tekoa appears in peasant's costume, and carries in his hand a shepherd's crook. The figures are about 7 ft. in height. An inscription disposed along the pedestals on which the lower figures stand tells that the window is "In memory of Fanny, wife of R. T. Hamilton Bruce, and daughter of John Bruce. Died 8th August, 1881; aged 24."

The Student's Column.

STONE QUARRIES.—VI.

DEVON AND CORNWALL GRANITES.

THE granite quarries which we propose first to describe are those situated in Devon and Cornwall.

Granite has been used in Cornwall from time immemorial for building and monumental purposes, but the process of raising it from quarries is of recent origin. Until within the last sixty years the only granite used was obtained from boulders upon the surface of the ground; but for all export purposes at least, quarrying has entirely superseded this primitive method, and is now a prominent industry in the county. The quarries produce very large blocks, whilst the fact that both fine and coarse grained granites are obtained is sufficient to render it capable of being used for either architectural or engineering work.

We may remark, however, that the vast majority of the granites of Devon and Cornwall are coarse-grained, with large felspar crystals scattered throughout, and that fine-grained varieties are not so common as in some of the other districts to be described. Haughton has shown that some of the white mica of the Cornish granites is lepidolite (lithia mica), whilst the black mica in the same rocks is often lepidomelane (iron-potash mica).*

The principal granite quarry-owners in the districts under consideration are Messrs. John Freeman & Sons, of Penryn, and we are indebted to Mr. Wm. Geo. Freeman, of that firm, for much valuable information respecting the quarries, and also for placing a number of samples from the principal quarries at our disposal, for examination. This firm alone has upwards of sixty quarries in Cornwall, situated principally in the large district near Penryn, embracing the parishes of Mabe, Stithians, Constantine, and Wendron; also in Penzance, Luxullian, and in the district north of Liskeard. There are shipping-places at Penzance, Penryn, Port Navas on the Helford river, Par Harbour, and Looe. In these quarries rocks weighing from 100 to 2,000 tons in solid masses, are frequently detached from their native position. The process of quarrying has gradually developed from the most primitive methods, until now, steam cranes, rock-drills, and other labour-saving appliances are in use.

The granite areas of Cornwall and Devon may be conveniently divided into five districts, and a glance at the following map will show their position, and the names we propose to call them.

Several patches of granite which are detached from these main masses need not here be taken into account, and any quarries in them will be referred to the nearest main mass.

1. *Dartmoor District.*

The great mass of granite in this district is coarse-grained, having quartz, felspar, and mica, the last mineral being sometimes white, at others black, and occasionally they are found together. The stone is very frequently porphyritic, and here and there schorlaceous,* but the latter character is chiefly confined to the outskirts where the granite adjoins the metamorphic rocks. Schorlaceous granite, however, is occasionally found in the interior of the mass, and there is a very gradual passage between schorl-rock (schorl and quartz) and ordinary granite, in some parts. As a rule, the mica disappears as the schorl becomes abundant. Rarely, the rocks are composed of quartz, felspar, mica, and schorl in about equal proportions. After the mica has disappeared, the felspar generally goes. The mass is much more variable in composition at its outskirts than anywhere else.

The following are some of the granite workings of the district, about which we have gleaned information.

Trowlesworthy Quarry. — This quarry is situated in the western part of Dartmoor, and is worked by Messrs. John Freeman & Sons. The stone is of a red colour, being the only "red" granite we know of, in any quantity, in the south-west of England.

Its rather inaccessible position, and the irregularity of the structure of the rock, render its introduction into the market on a large scale impracticable, but it is a very beautiful stone.

Haytor Quarries.—These are situated about fourteen miles south-west from Exeter, and are worked by Messrs. J. Easton & Son, of that city.

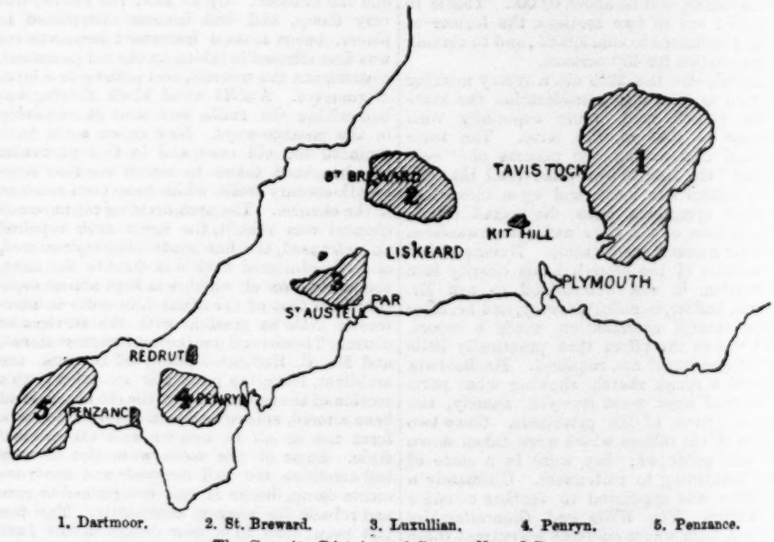
A large portion of London Bridge was built of it, and in those days the granite was shipped at Teignmouth, being carried thither on a granite tramway for five miles to a small canal, whence barges conveyed it to the ships.

We may call attention to the fact that at least two or three authors state that the Haytor quarries have ceased working,* and although the stone is not worked as extensively as formerly, it is incorrect to state that they are closed.

Blackenstone Quarry.—This quarry is near Moreton Hampstead, about eleven miles west of Exeter, and has been worked by Messrs. J. Easton & Son for forty years. The stone has a fine base, composed of felspar, of two colours, light pink and light green. The proportion of quartz does not appear to be very large; black mica is fairly abundant, being scattered about rather evenly. But the character of the stone is chiefly marked by the large porphyritic orthoclase felspars, of a light pink colour. In some cases these felspars do not appear to be so well defined as in the Haytor stone, occurring rather as patches of a broken-up appearance than clean crystals.

The stone splits easily with wedges, and is worked into copings, kerbs, steps, gate-posts, and rollers.

Foggintor, Great and Little *King Tor*, *Swell Tor*, *Crip Tor*, and *Inga Tor*, are quarries situated on Dartmoor, near Princetown, and worked by Messrs. Pethick Bros., of Plymouth. They are about fourteen miles from Plymouth, the port of shipment, and are connected with the Princetown railway, which runs by a siding direct into the quarries.



1. Dartmoor. 2. St. Breward. 3. Luxullian. 4. Penryn. 5. Penzance.

The Granite Districts of Cornwall and Devon.

The earliest quarrying operations in Dartmoor "Forest" on a large scale were at Haytor, and very large quantities were sent to London by the Haytor Granite Company. The company, after several years abandoned, these workings and removed to Foggintor, near Prince Town where it carried on extensive works and raised large quantities of granite, but eventually wound up some twenty years ago. Since then, however, the quarries have been re-opened, as we have seen.

The stone at Haytor appears to have a fine-grained base, of a light greenish grey colour; the felspar is of two tints, white and light green, being distributed evenly over the stone. Mica is very plentiful, the prevailing colour being black, but it approaches brown in places. The quartz is of the ordinary clear crystalline character. Much of the rock quarried at Haytor is wholly composed as above, but a considerable proportion has, in addition, some fine large orthoclase felspars distributed porphyritically. These spars are frequently 2 in. or 3 in. in length, are white, usually exhibit twining, and seem to lie in some cases approximately in the same direction. Very large stones may be obtained, and some time since, a piece about 45 ft. by 12 ft. by 12 ft. was shifted. It is worked principally for monumental purposes, but may also be utilised for steps, kerbs, &c., being taken to Bovey station, about four miles, and sent by rail to Exeter.

The breakwater, fort, and defences around Plymouth are built of Dartmoor granite.

Between the Dartmoor and St. Breward districts is a little patch of granite generally known under the name of *Kit Hill*. On it the Kit Hill, Tamar, and Gunnislake quarries are situated, and although nothing very large has been done in the way of raising the stone, yet many people know of it by reason of the circulars issued to the public giving a full account of prospective work. The grain of the rock is fine, and the position of the quarries, near the Tamar, no doubt looks tempting for work and easy carriage; but the uncertain quality, and being so full of joints, has hitherto debarred its extensive use.

2. *St. Breward District.*

The mineralogical composition of this mass is very similar to that of Dartmoor, being principally made of quartz, felspar, and two micas. It is frequently porphyritic, not particularly schorlaceous, though small crystals of schorl are sometimes found, chiefly towards the south. Near St. Clear all four minerals are present.

Proceedings Royal Society, vol. xvii., p. 209.

* *I.e.*, having schorl (a black mineral) in addition to the three essential minerals.

* See "Guide to Mus. Prac. Geol.," p. 26, quoted in Hull's "Building and Ornam. Stones," p. 35; and Rivington's "Build. Const.," part iii., Materials, p. 18.

The *Cheesewring Quarries* comprise the Cheesewring quarries proper, and Kilmar and Bearah Tor. They are all worked by Messrs. J. Freeman & Sons, on the property of the Duchy of Cornwall, being situated about six miles north of Liskeard. The produce is sent direct to the shipping-port of Looe over the Liskeard and Caradon Railway, which is connected with the quarries.

The stone is coarsely crystalline, each mineral being easily distinguished, and although the orthoclase felspar in places is rather large, the rock cannot be said to be very porphyritic. This mineral is quite white, and some of the more regular crystals exhibit twinning. The micas are black, white, and brown. Of these the first is most abundant. Quartz is clear and transparent.

The compact manner in which the minerals composing this stone are arranged, together with the fact that such large blocks can be obtained, renders it unquestionably one of the best granites for large engineering purposes.

De Lank or Eddystone Quarries. — These are situated near Bodmin, and are worked by Messrs. H. Shearer & Co.

The constituents of the rock are two species of felspar, one orthoclase, the other a triclinic felspar, which exhibit in some cases a somewhat granulated structure. There are two species of mica, biotite (black), and muscovite (silvery white). A large proportion of quartz is present, and here and there a very few exceedingly minute crystals of apatite. The quartzose portions consist of small crystalline grains, and there appears to be little or no hornblende, no pyrites, and magnetite if present is only represented by a few exceedingly minute specks.

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Richmond-hill—Terrace Cottage, freehold ... 1,000

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By DEBENHAM, TEWSON, & CO.

Paddington—Ground-rents of 91l., term 53 years ... 1,820

Canonbury—Ground-rent of 28l. 15s., a year, term 50 years ... 560

By DRIVER & PERFECT.

St. Luke's—45, Baltic-street, freehold ... 405

No. 3, Domingo-street, freehold ... 910

By WAGSTAFF & WARMAN.

Hendon—Two plots of freehold land ... 200

By C. & H. WHITE.

Kennington—6, Kempsford-road, 40 years, ground-rent 4l. ... 345

Batterses—104 to 112 (even), Livingstone-road, 78 years, ground-rent 27l. 10s. ... 535

Improved ground-rents of 15l., term 75 years ... 250

By H. RUTLEY.

Chalk Farm—26 and 28, Ferdinand-street, freehold ... 1,150

Caledonian-road—Ground-rents of 36l. 15s., term 57 years ... 740

Ground-rents of 12l. 10s., term 62 years ... 260

Ground-rents of 26l. 12s., term 65 years ... 415

Hampstead-road—Ground-rents of 12l., term 38 years ... 200

Kilburn—An improved rental of 99l. 10s., term 76 years ... 1,870

Cavendish-square—An improved rental of 30l., term 12 years ... 240

Hampstead-road—137, Stanhope-street, 38 years, ground-rent 6l. ... 500

Islington—3, Stonefield-terrace, 20 years, ground-rent 5l. ... 235

By MESSRS. SPELMAN.

Norwich—The freehold residence, Rosary House ... 2,750

Dove-street—Two freehold houses with shops ... 920

King-street—The City Café, freehold ... 290

Fishgate-street—Two freehold cottages ... 82

Acle, Damgate—Two freehold houses ... 130

JULY 28.

By G. A. WILKINSON.

Oxford-street—74, Wells-street, 45 years, ground-rent 20l. ... 830

By A. G. THOMSON & CO.

Tottenham Court-road—4, Whitfield-street, copyhold ... 890

Acton—100, Bollo Bridge-road, freehold ... 540

Birkbeck-road—A plot of freehold land ... 60

By BAXTER, PAYNE, & LEPPER.

Bromley, near—A plot of freehold land ... 260

By HOBSON, RICHARDS, & CO.

Deptford—38 and 40, Wellington-street, freehold ... 660

By THURGOOD & MARTIN.

Putney—11, Putney-hill, 63 years, ground-rent 12l. 12s. ... 1,200

No. 140, Upper Richmond-road, freehold ... 630

Ground-rent of 6l. 17s. 6d., reversion in 75 years ... 140

Ground-rent of 25l., reversion in 72 years ... 470

Ground-rent of 92l. 10s., reversion in 90 years ... 2,000

Kentish Town—46 and 94, Woodnaston-road, 64 years, ground-rent 16l. 16s. ... 370

By A. ROBERTSON.

Camberwell-road—No. 68, freehold ... 1,100

By H. A. COX.

Dockhead—34, 36, and 38, Neckinger street, and 30, 32, and 34, Arnold's-place, 13 years, ground-rent, 11l. ... 260

Southwark—169 and 171, Drummond-street, 25 years, ground-rent 4l. 10s. ... 460

Bermondsey—7 to 17 (odd), Parker-road, 27 years, ground-rent 19l. 4s. ... 1,210

Nos. 2 to 6 (even), Willow-walk, 20 years, ground-rent 2 l. ... 1,020

Nos. 21 and 22, Fream-street, 21 years, ground-rent 6l. ... 175

Nos. 40 to 46 (even), Lman-street, 14 years, ground-rent 8l. ... 260

Nos. 92 and 94, Rouel-road, 28 years, ground-rent 6l. ... 420

No. 50, Jamaica-road, and 23, Fream-street, 29 years, ground-rent 7l. 5s. ... 405

Nos. 2 to 7 (odd), Neckinger-street, and 9, 11, and 13, Limau-street, 14 years, ground-rent 18l. ... 420

Nos. 153 and 154, Grange-road, 31 years, ground-rent 20l. ... 720

St. Giles's Cathedral, Edinburgh.—The Bruce memorial window, which has just been placed in the west end of the nave of St. Giles's, is a very marked addition to the decoration of the cathedral. It is by Cottier, of London. The subject of the window is "The Prophets,"—"These are the prophets of whom our fathers spake," as is inscribed on a scroll in old English characters. The window has five lights with a transom in the centre, giving ten compartments, in each of which the counterfeit presentment of a prophet is placed. The tracery above has been filled in with prophetic emblems,—such as Ezekiel's wheel, &c. Reading from south to north, there appear in the upper compartments of the window, Isaiah, Jeremiah, David, Ezekiel, and Daniel; and in the lower set, Amos, Jonah, Elijah, Zechariah, and Malachi. In the faces and habiliments of the figures something of the characteristics of the several prophets mentioned have been reproduced. The Shepherd King, attired in royal robes, plays on his harp; Jeremiah, in sombre raiment, laments over Israel; while the herdman of Tekoa appears in peasant's costume, and carries in his hand a shepherd's crook. The figures are about 7 ft. in height. An inscription disposed along the pedestals on which the lower figures stand tells that the window is "In memory of Fanny, wife of R. T. Hamilton Bruce, and daughter of John Bruce. Died 8th August, 1881; aged 24."

The Student's Column.

STONE QUARRIES.—VI.

DEVON AND CORNWALL GRANITES.

THE granite quarries which we propose first to describe are those situated in Devon and Cornwall.

Granite has been used in Cornwall from time immemorial for building and monumental purposes, but the process of raising it from quarries is of recent origin. Until within the last sixty years the only granite used was obtained from boulders upon the surface of the ground; but for all export purposes at least, quarrying has entirely superseded this primitive method, and is now a prominent industry in the county. The quarries produce very large blocks, whilst the fact that both fine and coarse grained granites are obtained is sufficient to render it capable of being used for either architectural or engineering work.

We may remark, however, that the vast majority of the granites of Devon and Cornwall are coarse-grained, with large felspar crystals scattered throughout, and that fine-grained varieties are not so common as in some of the other districts to be described. Haughton has shown that some of the white mica of the Cornish granites is lepidolite (lithia mica), whilst the black mica in the same rocks is often lepidomelane (iron-potash mica).*

The principal granite quarry-owners in the districts under consideration are Messrs. John Freeman & Sons, of Penryn, and we are indebted to Mr. Wm. Geo. Freeman, of that firm, for much valuable information respecting the quarries, and also for placing a number of samples from the principal quarries at our disposal, for examination. This firm alone has upwards of sixty quarries in Cornwall, situated principally in the large district near Penryn, embracing the parishes of Mabe, Stithians, Constantine, and Wendron; also in Penzance, Luxullian, and in the district north of Liskeard. There are shipping-places at Penzance, Penryn, Port Navas on the Helford river, Par Harbour, and Looe. In these quarries rocks weighing from 100 to 2,000 tons in solid masses, are frequently detached from their native position. The process of quarrying has gradually developed from the most primitive methods, until now, steam cranes, rock-drills, and other labour-saving appliances are in use.

The granite areas of Cornwall and Devon may be conveniently divided into five districts, and a glance at the following map will show their position, and the names we propose to call them.

Several patches of granite which are detached from these main masses need not here be taken into account, and any quarries in them will be referred to the nearest main mass.

1. *Dartmoor District.*

The great mass of granite in this district is coarse-grained, having quartz, felspar, and mica, the last mineral being sometimes white, at others black, and occasionally they are found together. The stone is very frequently porphyritic, and here and there schorlaceous,* but the latter character is chiefly confined to the outskirts where the granite adjoins the metamorphic rocks. Schorlaceous granite, however, is occasionally found in the interior of the mass, and there is a very gradual passage between schorl-rock (schorl and quartz) and ordinary granite, in some parts. As a rule, the mica disappears as the schorl becomes abundant. Rarely, the rocks are composed of quartz, felspar, mica, and schorl in about equal proportions. After the mica has disappeared, the felspar generally goes. The mass is much more variable in composition at its outskirts than anywhere else.

The following are some of the granite workings of the district, about which we have gleaned information.

Trowlesworthy Quarry.—This quarry is situated in the western part of Dartmoor, and is worked by Messrs. John Freeman & Sons. The stone is of a red colour, being the only "red" granite we know of, in any quantity, in the south-west of England.

Its rather inaccessible position, and the irregularity of the structure of the rock, render its introduction into the market on a large scale impracticable, but it is a very beautiful stone.

Haytor Quarries.—These are situated about fourteen miles south-west from Exeter, and are worked by Messrs. J. Easton & Son, of that city.

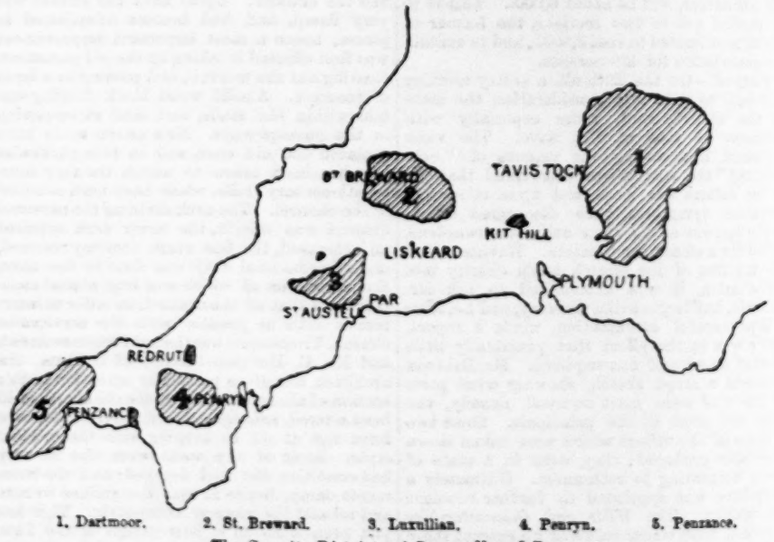
A large portion of London Bridge was built of it, and in those days the granite was shipped at Teignmouth, being carried thither on a granite tramway for five miles to a small canal, whence barges conveyed it to the ships.

We may call attention to the fact that at least two or three authors state that the Haytor quarries have ceased working,* and although the stone is not worked as extensively as formerly, it is incorrect to state that they are closed.

Blackenstone Quarry.—This quarry is near Moreton Hampstead, about eleven miles west of Exeter, and has been worked by Messrs. J. Easton & Son for forty years. The stone has a fine base, composed of felspar, of two colours, light pink and light green. The proportion of quartz does not appear to be very large; black mica is fairly abundant, being scattered about rather evenly. But the character of the stone is chiefly marked by the large porphyritic orthoclase felspars, of a light pink colour. In some cases these felspars do not appear to be so well defined as in the Haytor stone, occurring rather as patches of a broken-up appearance than clean crystals.

The stone splits easily with wedges, and is worked into copings, kerbs, steps, gate-posts, and rollers.

Foggintor, Great and Little *King Tor*, *Swell Tor*, *Crip Tor*, and *Inga Tor*, are quarries situated on Dartmoor, near Princetown, and worked by Messrs. Pethick Bros., of Plymouth. They are about fourteen miles from Plymouth, the port of shipment, and are connected with the Princetown railway, which runs by a siding direct into the quarries.



1. Dartmoor. 2. St. Breward. 3. Luxullian. 4. Penryn. 5. Penzance.

The Granite Districts of Cornwall and Devon.

The earliest quarrying operations in Dartmoor "Forest" on a large scale were at Haytor, and very large quantities were sent to London by the Haytor Granite Company. The company, after several years abandoned, these workings and removed to Foggintor, near Prince Town where it carried on extensive works and raised large quantities of granite, but eventually wound up some twenty years ago. Since then, however, the quarries have been re-opened, as we have seen.

The stone at Haytor appears to have a fine-grained base, of a light greenish grey colour; the felspar is of two tints, white and light green, being distributed evenly over the stone. Mica is very plentiful, the prevailing colour being black, but it approaches brown in places. The quartz is of the ordinary clear crystalline character. Much of the rock quarried at Haytor is wholly composed as above, but a considerable proportion has, in addition, some fine large orthoclase felspars distributed porphyritically. These spars are frequently 2 in. or 3 in. in length, are white, usually exhibit twining, and seem to lie in some cases approximately in the same direction. Very large stones may be obtained, and some time since, a piece about 45 ft. by 12 ft. by 12 ft. was shifted. It is worked principally for monumental purposes, but may also be utilised for steps, kerbs, &c., being taken to Bovey station, about four miles, and sent by rail to Exeter.

The granite from the Swell Tor quarry is of two colours, grey and blue; the blue appears to be a good hard, compact stone, and is largely used for street work, kerbs, &c.

The breakwater, fort, and defences around Plymouth are built of Dartmoor granite.

Between the Dartmoor and St. Breward districts is a little patch of granite generally known under the name of *Kit Hill*. On it the Kit Hill, Tamar, and Gunnislake quarries are situated, and although nothing very large has been done in the way of raising the stone, yet many people know of it by reason of the circulars issued to the public giving a full account of prospective work. The grain of the rock is fine, and the position of the quarries, near the Tamar, no doubt looks tempting for work and easy carriage; but the uncertain quality, and being so full of joints, has hitherto debarred its extensive use.

2. *St. Breward District.*

The mineralogical composition of this mass is very similar to that of Dartmoor, being principally made of quartz, felspar, and two micas. It is frequently porphyritic, not particularly schorlaceous, though small crystals of schorl are sometimes found, chiefly towards the south. Near St. Clear all four minerals are present.

* Proceedings Royal Society, vol. xvii., p. 208.

* *I.e.*, having schorl (a black mineral) in addition to the three essential minerals.

* See "Guide to Mus. Prac. Geol.," p. 26, quoted in Hull's "Building and Ornam. Stones," p. 35; and Rivington's "Build. Const.," part iii., Materials, p. 18.

The *Cheesewring Quarries* comprise the Cheesewring quarries proper, and Kilmar and Bearah Tor. They are all worked by Messrs. J. Freeman & Sons, on the property of the Duchy of Cornwall, being situated about six miles north of Liskeard. The produce is sent direct to the shipping-port of Looe over the Liskeard and Caradon Railway, which is connected with the quarries.

The stone is coarsely crystalline, each mineral being easily distinguished, and although the orthoclase felspar in places is rather large, the rock cannot be said to be very porphyritic. This mineral is quite white, and some of the more regular crystals exhibit twinning. The micas are black, white, and brown. Of these the first is most abundant. Quartz is clear and transparent.

The compact manner in which the minerals composing this stone are arranged, together with the fact that such large blocks can be obtained, renders it unquestionably one of the best granites for large engineering purposes.

De Lank or Eddystone Quarries. — These are situated near Bodmin, and are worked by Messrs. H. Shearer & Co.

The constituents of the rock are two species of felspar, one orthoclase, the other a triclinic felspar, which exhibit in some cases a somewhat granulated structure. There are two species of mica, biotite (black), and muscovite (silvery white). A large proportion of quartz is present, and here and there a very few exceedingly minute crystals of apatite. The quartzose portions consist of small crystalline grains, and there appears to be little or no hornblende, no pyrites, and magnetite if present is only represented by a few exceedingly minute specks.

The following is the approximate mineral constitution of the De Lank granite, by Mr. Frank Rutley, F.G.S., of the Geological Survey, Jermyn-street, S.W., arrived at by an adaptation of Delesse's method :—

Orthoclase felspar	30
Triclinic do.	6
Magnesian mica (biotite)	7
Potash mica (muscovite)	11
Quartz	46
	100

Its colour is of a uniform light grey, and there is little or no tendency of the stone to become porphyritic, as far as we can see.

Large blocks are obtained, and the joints are so regular that they require but little blasting to shift them out of their natural position. The resources of the quarries are practically unlimited, and the facility with which the stone can be supplied may be judged by the remarks of Sir James Douglass, Engineer-in-Chief to the Trinity House, in the discussion which took place on the "New Eddystone Lighthouse" (built of De Lank granite) at the Institute of Civil Engineers on the 27th November, 1883, when he pointed out that the granite contractors had completed their work six months within the specified time,—three years.

This granite has also been used for the Smalls Rock Lighthouse, and in works at Portland, Devonport, Blackfriars Bridge, &c. It is shipped at Wadebridge, on the river Camel, within Padstow Harbour.

RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

6,688, Street Paving. A. de St. Dalmas.

Instead of the wooden blocks now in use for street paving, which absorb water and deleterious matter, blocks of compressed paper pulp or similar porous material, impregnated with a compound of coal-dust and oil in suitable proportions, are used. This it is claimed is an important sanitary improvement, as coal-dust prevents decay and prevents the absorption of foul matter, it enters the pores of the blocks, and being of a gritty character, forms an excellent surface, not so liable to be churned into mud as when coal-dust is not used.

12,332, Chimney-tops. F. H. Smith.

This consists of an arrangement of plates or blades of metal or other material made fast to the interior of pipes alternately at angles placed about two-thirds across the diameter of the pipe or tube, and overlapping each other about 4 in. ; these pipes have slots or openings cut in their two opposite sides at the lower edge of the plates, and at the acute angles formed by the plates and the sides of the pipe, to allow the smoke and blow-down to escape, and the soot or such like accumulation that may collect on the upper side of the plates to drop out.

9,617, Improvements in Dustbins. J. C. Morrell.

In order to obviate the offensiveness of the removal of the household refuse from the dustbin, as ordinarily constructed, and to promote economy in the household, a dustbin, having screens or sieves, at suitable angles, is used. These screens separate the various *débris* thrown in, and cinders and ashes are also separated by them. In emptying the bin or the cases contained in it, covers are supplied to the dustmen so that they may be emptied into the cart without the dust flying about, rendering the dustman's work convenient and cleanly. The cinders are saved for re-burning.

9,519, Water-closet Apparatus. C. Winn.

The improvements are in the direction of simplifying the construction and arrangement of parts of wash-out closets, and in the means of connecting such closets to flushing apparatus, and to stack or soil pipes. The basin is of an elliptical shape, the wider end of the ellipse being at the back part of the basin. The outlet is in the front and is hidden by a projecting hood, and the front of the basin is also continued downwards as an ornamental pillar to the level of the trap, which is also flanged, and thus affords a wide base, and renders the closet self-supporting, being secured to the floor. Several modifications of the shape of the pipes and fittings are made, each of them having reference to simple means of connecting the points, or to placing them so that all parts may be readily accessible, and also afford a free and open passage for flushing out.

NEW APPLICATIONS FOR PATENTS.

July 23.—9,540, S. Alexander, Rain-water Piping.—9,544, W. Blakeney, Shop Window Fittings.—9,551, W. Reid, Hydraulic Cement.—9,552, E. & H. Lanaway, Ladders.

July 24.—9,577, J. Potts, Construction, Bedding, and Laying Drain, or Sewer Pipes.—9,584, A. Sweet, Ventilators or Windguards.

July 26.—9,612, F. Royce, Electric Bells.—9,625, Sir F. Bolton, Coverings for Roofs, &c.—9,643 and 9,644, H. Lake, Construction of Walls, Ceilings, &c.

July 28.—9,724, W. Patterson, Water Taps.—9,729, T. Bayley, Colouring Marble.—9,730, J. Siemers, Scaffolding.—9,748, H. Whiteley, Opening and Closing Fanlights, Windows, &c.

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By DEBENHAM, TEWSON, & Co.

Paddington—Ground-rents of 91*l.*, term 53 years... 1,820
Canonbury—Ground-rent of 28*l.* 15s., a year, term 50 years 580

By DRIVER & PREFECT.

St. Luke's—45, Baltic-street, freehold 405
No. 3, Domingo-street, freehold 900

By WAGSTAFF & WARMAN.

Hendon—Two plots of freehold land..... 100

By C. & H. WHITE.

Kennington—6, Kempsford-road, 40 years, ground-rent 4*l.* 345
Battersea—104 to 112 (even), Livingstone-road, 78 years, ground-rent 27*l.* 10s. 535
Improved ground-rents of 18*l.*, term 75 years ... 250

By H. RUTLEY.

Chalk Farm—26 and 28, Ferdinand-street, freehold 1,150
Caledonian-road—Ground-rents of 39*l.* 15s., term 57 years 740
Ground-rents of 12*l.* 10s., term 63 years 200
Ground-rents of 26*l.* 13s., term 65 years 415
Hampstead-road—Ground-rents of 12*l.*, term 38 years..... 200
Kilburn—An improved rental of 99*l.* 10s., term 76 years..... 1,620
Cavendish-square—An improved rental of 30*l.*, term 12 years 240
Hampstead-road—137, Stanhope-street, 38 years, ground-rent 6*l.* 590
Islington—3, Stonefield-terrace, 20 years, ground-rent 5*l.* 235

By MESSRS. SPELMAN.

Norwich—The freehold residence, Rosary House ... 2,750
Dove-street—Two freehold houses with shops..... 920
King-street—The City Café, freehold..... 290
Fishgate-street—Two freehold cottages..... 82
Acle, Damgate—Two freehold houses 138

JULY 28.

By G. A. WILKINSON.

Oxford-street—74, Wells-street, 45 years, ground-rent 20*l.* 830

By A. G. THOMSON & Co.

Tottenham Court-road—4, Whitfield-street, copyhold 890
Acton—100, Bollo Bridge-road, freehold 580
Birkbeck-road—A plot of freehold land 80

By BAXTER, PAYNE, & LEPPER.

Bromley, near—A plot of freehold land 380

By HONSON, RICHARDS, & Co.

Deptford—38 and 40, Wellington-street, freehold... 660

By THURGOOD & MARTIN.

Putney—11, Putney-hill, 63 years, ground-rent 12*l.* 12s. 1,225
No. 140, Upper Richmond-road, freehold 630
Ground-rent of 6*l.* 17s. 6d., reversion in 75 years. 180
Ground-rent of 25*l.*, reversion in 72 years 670
Ground-rent of 92*l.* 10s , reversion in 50 years 2,850
Kentish Town—92 and 94, Weedington-road, 64 years, ground-rent 10*l.* 10s. 370

By A. ROBERTSON.

Camberwell-road—No. 68, freehold..... 1,100

By H. A. COX.

Dockhead—34, 36, and 38, Neckinger street, and 30, 32, and 34, Arnold's-place, 13 years, ground-rent, 11*l.* 260
Southwark—169 and 171, Drummond-street, 35 years, ground-rent 4*l.* 16s..... 480
Bermondsey—7 to 17 (odd), Fort-road, 37 years, ground-rent 19*l.* 4s..... 1,210
Nos. 2 to 6 (even), Willow-walk, 30 years, ground-rent 2 *l.* 1,020
Nos. 21 and 22, Fream street, 31 years, ground-rent 6*l.* 275
Nos. 40 to 46 (even), Limasol-street, 14 years, ground-rent 8*l.* 200
Nos. 82 and 84, Ronel-road, 28 years, ground-rent 6*l.* 420
No. 50, Jamaica-road, and 23, Fream-street, 28 years, ground-rent 7*l.* 5s. 435
Nos. 3 to 7 (odd), Neckinger-street, and 9, 11, and 13, Limasol-street, 14 years, ground-rent 18*l.* 425
Nos. 153 and 154, Grange-road, 31 years, ground-rent 10*l.* 750

July 29.

By F. C. Kettle.

Walthamstow—Arundel Villa, 97 years, ground-rent 6*l.* £210

By Protheroe & Morris.

Sydenham, Byrne-road—Two plots of freehold land 140

By Newbon & Harding.

Bethnal-green—51 to 59 (odd), White-street, freehold 1,815
Nos. 24, 26, and 28, Menotti-street, freehold 905
Long Acre—19, Betterton-street, freehold 9 0
Clapton—89 and 90, Dunlace-road, 89 years, ground-rent 8*l.* 8s. 410
Stoke Newington—113, Milton-road, 65 years, ground-rent 6*l.* 200

By D. Young.

Stockwell—71, Studley-road, 50 years, no ground-rent 480

By B. Brown.

West Ham—19 and 21, Boleyn-road, 96 years, ground-rent 7*l.* 480
Peckham—65, Chadwick-road, 70 years, ground-rent 9*l.* 16s. 550

By Hands & Jenkinson.

Edmonton—Ground-rents of 18*l.* 18s., reversion in 93 years 330
Bromley-common—Ground-rents of 12*l.*, reversion in 97 years 230
Cowper-road—Three plots of freehold land 660

By E. Stimson.

Harrow-road—14, Windsor-street, 59 years, ground-rent 5*l.* 10s. 220
Peckham—3 and 4, Haslemere-street, 78 years, ground-rent 10*l.* 300
Camberwell—59, Westmacott-street, 97 years, ground-rent 8*l.* 300
Walworth—3 and 5, Flint-street, 63 years, ground-rent 12*l.* 595
Kennington—41 and 43, Bowling-green-lane, ground-rent 2*l.* 135
Hackney—Ground-rent of 4*l.*, term 23 years 48
Plaistow, Libra-road—Two plots of freehold land 90
Brixton—Ground-rents of 29*l.* 15s., term 36 years 455
Ground-rents of 80*l.* 5s., term 14 years 645
Camberwell—Ground-rents of 50*l.*, term 15 years 345

July 30.

By Venton, Bull, & Cooper.

Goswell-road—Nos. 13 and 15, freehold 6,900

By A. Baker.

Gipsy-hill—The Hermitage, and 1 and 2, Malta Cottages, freehold 1,000
Teddington—No. 1, Groveside, freehold 1,060

By R. Reid.

Kilburn—35, Malvern-road, 89 years, ground-rent 10*l.* 655
Harrow-road—83, Portnall-road, 92 years, ground-rent 7*l.* 240
No. 85, Portnall-road, 92 years, ground-rent 7*l.* 225

By Dale & Son.

Bow—21, Cardigan-road, freehold 350
Ground-rent of 4*l.*, reversion in 68 years 100
Roydon, Essex—Two cottages and a plot of land, freehold 430
Hall's-green—Two freehold cottages 190

Miscellanea.

The Building Trades in Australia.—According to the Immigration Agent at Sydney, the latest quotations in the Sydney building trades' wages were:—Carpenters and joiners, 9s. to 11s. 6d. per day, standard price 10s. per day; stonemasons' labourers, 8s. to 9s.; plasterers, 11s.; plasterers' labourers, 9s.; bricklayers, 11s. to 12s.; bricklayers' labourers, 8s. to 9s.; painters, 9s. to 10s.; plumbers, 10s. to 10s. 6d.; gasfitters, 10s. to 10s. 6d.; sawmill hands, 9d. to 1s. per hour. With regard to brickmakers' wages in New South Wales, he says,—The demand for bricks for building purposes in New South Wales is considerably in excess of the supply; hence brickmaking is one of the most profitable industries in that colony. Brickmakers receive from 1*l.* 2s. 6d. to 1*l.* 10s. per 1,000; bricklayers, 12s. per day. Where employed in connexion with machine-made bricks the remuneration is from 8s. to 10s. and 11s. per day. Pipemakers average from 2*l.* 10s. to 3*l.* per week, and potters obtain about the same rate of wages. Pitmen, 7s. 6d. to 8s. 4d.; setters, 7s. 6d. to 8s.; rollers, 9s.; screeners, 7s.; burners, 10s.; kiln men, 7s.; loaders, 7s. to 8s.

Sutton-in-Ashfield.—A few days since Mr. Stephen H. Terry, C.E., one of the Inspectors of the Local Government Board, held an inquiry at Sutton-in-Ashfield, in regard to an application for borrowing powers which had been made by the Local Board in order to supply the district of Hucknall Huthwaite with water from the works now in progress. The water is obtained from the red sandstone, and is being pumped at the rate of 740,000 gallons a day. Mr. Hodson, the engineer, stated that the demand would not be likely to exceed 300,000 gallons for some years. The application was unopposed; and the Inspector, in closing his inquiry, said he thought the Hucknall people were very much to be congratulated on having neighbours who could supply them with excellent water, and at so low a price as 7d. per 1,000 gallons, which was but little more than cost price.

Drink in the Building Trade.—The modern practice of erecting in our principal cities huge buildings with iron columns and girders of many tons' weight necessarily entails commensurate risks on those who are engaged in the works. Cranes and derricks, self-stopping pulley-blocks, and thoroughly-tested chains, while economising labour, tend to minimise the number of accidents, but also to aggravate their destructive power when they do occur. It is truly wonderful to see a granite pillar or an iron girder lifted and swung round over any part of a building area, and then deposited accurately and smoothly on any given point with singularly little help from comparatively few men. But how necessary that every one of them should be at his best, cool-headed and steady-handed. When a crash does take place, the explanation is generally found in some flaw in the machinery; but it is to be feared that every now and then an oversight or a slip on the part of any of the men may be the first cause of the break-down. It is only just to bear in mind that the building trade is a very laborious one, and that a large proportion of the men engaged in it are distinguished amongst artisans for intelligence, sobriety, and thrift. But just as the strength of the chains and ropes employed is only equal to that of the weakest link or strand, so at a critical moment the efficiency of a band of workers is only equal to that of the individual man; one failing may imperil all. Dust and labour, often over-long hours in working under contract against time, make men thirsty and tired; and if any one watches a great building, he often sees men slip out for a drink at the nearest public-house. It is only occasionally that the building area can be completely enclosed and placed under the charge of a trusty gatekeeper, but something might always be done to provide the men on the ground with cooling and invigorating drinks. Cocoa, lime-juice, or oatmeal could be dispensed for a comparative trifle, and, failing these, a large water-filter and a few earthen cups might be a great comfort, and avert the temptation of rushing to the beer-barrel and the spirit-vat with a parched tongue and an empty stomach. The men, timely refreshed, would work longer and with greater power and safety, and when an accident did happen, as may sometimes be unavoidable, it would be a satisfaction to feel that at the critical moment every man was at his best, mentally and physically.—*Lancet.*

Leeds and Yorkshire Architectural Society.—On Saturday afternoon a party of the members of this society visited the neighbourhood of Keighley. The Mechanics' Institute, Art, and Technical School (now undergoing enlargement by Messrs. W. & R. Mawson, architects, of Bradford), was first visited, and the clerk of works (Mr. T. A. Sugden) conducted the party over the works. West Ryddlesden Hall, an Elizabethan structure, owned and occupied by Mrs. Sidgwick, was, through the courtesy of that lady, next inspected. Afterwards East Ryddlesden Hall, known locally as "Old Ryddlesden Hall," was, by the kindness of Mr. Bailey, the tenant, thrown open to the visitors. The latter house is described in the *Leeds Mercury* as a good specimen of the transitional period of the Renaissance, and in its essentials it remains in its original form.——A meeting of the members of the Associates' Sketching and Art Club was held on the previous evening, when the drawings produced during the past month were exhibited. Amongst them are Mr. A. Whitehead's drawings of Fountains Hall, near Ripon, and view of Kirkstall Abbey; Mr. Frank Haigh's "Tower of Fountains Abbey;" and Mr. A. E. Dixon's "West Doorway, Headingley Church."

The "Evening Telegraph" Office, Belfast. — New premises for the *Belfast Evening Telegraph*, situate in Royal Avenue, have lately been completed and opened. They have a frontage of 76 ft. 6 in. to the thoroughfare named, with a return frontage of 101 ft. 6 in. to Little Donegall-street. The building is 76 ft. in height, and the elevations are of red Dumfries sandstone and red perforated brick from the Ormeau works. The style is described as "a free treatment of Classic." The entire contract for the erection of the building has been carried out by Messrs. H. & J. Martin, Ormeau Works, Belfast, from the plans and under the personal superintendence of the architect, Mr. Henry Seaver, C.E., Belfast.

Banbury and Cheltenham Direct Railway.—This line is so far completed that trains can now be run through from the junction at King's Sutton to Chipping Norton. The entire length of the line between King's Sutton and Chipping Norton is 15¾ miles, and it commences with a junction with the Great Western at King's Sutton. In addition to the stations at Adderbury and Bloxham, there are stations at Hook Norton and Chipping Norton, the last being a joint station with the Great Western Company, whose existing station will be pulled down. At Bloxham station provision has been made for a large development of the ironstone traffic, and sidings have been laid into the adjoining fields, in which the ironstone is 12 ft. to 14 ft. deep, and extends over a large area. Just before reaching Hook Norton the heavy works commence with a deep cutting. After the line was commenced it was found advisable, in consequence of the nature of the soil, to abandon the work that had been done in this cutting, and deviate the line so as to get lower down the side of the hill where the cutting could be made much shallower. This cutting is immediately succeeded by a bank 50 ft. high, and this has been a source of considerable trouble, cost, and delay, and it has been necessary to construct heavy stone buttresses to keep it in its place, and to form the upper portion of it with ashes, which were obtained from South Staffordshire. Passing over this bank, the Hook Norton and Banbury-road is crossed by an iron girder bridge, and Hook Norton Station is reached. This, with all the buildings and yard, are on an embankment 50 ft. high at the highest point. Here a large goods shed is being erected, the station and offices having been already built. A deep valley is then spanned by a viaduct of five spans of 100 ft. each, formed of massive stone piers, 73 ft. high, and iron girders, the line then crosses another bank, succeeded by another viaduct of eight 100 ft. spans consisting of stone piers, 90 ft. high, with iron girders. Mr. William Wilson, of Dean's Yard, Westminster, is the engineer, and the works have been carried out without the intervention of a contractor under the direction of Mr. H. Holt. —*Banbury Guardian.*

The New Harlem River Bridge.—The Harlem River Bridge Commissioners have given the contract for building the new bridge over the Harlem river at 181st-street, New York, to the Passaic Rolling Mill Company, of Patterson, New Jersey. There were three tenders for the erection of the entire structure, including both the metallic and stone portions, the lowest ($2,055,000) being that of the above firm, one other tender, by the Union Bridge Company, being very close upon that figure, the latter company tendering at $2,058,000. The construction of the bridge is to be begun at once, and the structure is to be ready to be opened for traffic on June 28, 1888. According to the plans, prepared by Mr. William McAlpine, the new bridge will extend over the Harlem river from Tenth-avenue and 181st-street, on the west side, to Aqueduct-avenue, on the east side, a distance of 2,373 ft. The first 355 ft., however, from Tenth-avenue, will be simply grading. The total width of the bridge will be 80 ft., of which 50 ft. will be carriage-way, and 15 ft. on the each side footpath. The floor of the bridge will be 145 ft. above mean high-water mark. The piers will be sunk to the solid rock. From a central stone pier, 40 ft. thick, will spring on both sides an arch of iron and steel 508 ft. long, with a rise of 90 ft. One of the arches will completely span the river, what may be called its land end resting upon a pier on its west bank, whilst the end of the other arch, which will span the railway track, Commerce-avenue, and Sedgwick-avenue, will rest on a pier placed away from the river, east of Sedgwick-avenue. The two masonry sections of the bridge will be alike, although not of the same length, that on the west side being 277 ft., that on the east 342 ft. long. The masonry portions will be faced with Westchester gneiss, laid in courses of 20 in. to 30 in. thick, the interior stone being durable limestone. It is a special feature of the design that the constructive details are so arranged that all the iron and steel portions are to be accessible for cleaning and painting, an important consideration in metallic structures, the endurance of which very much depends upon how they are protected from corrosion.

The Proposed Baths and Washhouses for Kensington.—General C. Phipps Carey, R.E., one of the inspectors of the Local Government Board, held an inquiry at the Town Hall, Kensington, the other day, into the circumstances attending the application of the Commissioners of the Baths and Washhouses for the Parish of St. Mary Abbott's for sanction to borrow 25,543*l.* for the erection of the building. There were present Mr. G. C. Harding, Clerk to the Vestry; Mr. Verity, the architect; Mr. Boutcher, and other commissioners. Mr. Harding said the site had been settled at a previous inquiry of the Local Government Board, and the nature of the building decided upon. Tenders were invited for erecting the building, the highest being 31,500*l.*, and the lowest 25,543*l.* Mr. Verity produced the plans, showing first, second, and third class men's swimming-baths, one for women, and thirty-four private first and third class baths, twenty second-class women's, with space for sixty washers and drying-houses in the laundry. The swimming-bath could be used for public meetings or as a gymnasium in winter. The size of the large swimming-bath was about 90 ft. by 60 feet. There were residences for superintendent and engineer. It was also explained that the site had been fixed at the apex of Silchester and Lancaster roads, and in a part of the parish frequented by the lower classes and those likely to require the baths and washhouses. Some further details as to the population, assessable value of the parish, &c., having been taken by the Inspector, he intimated that he should make his report to the Local Government Board.

The London and County Banking Company (Limited).—The report of the directors, submitted to the half-yearly meeting held on Thursday last, states that after paying interest to customers and all charges, making provision for bad and doubtful debts, and for 32,886*l.* 14s. 5d. rebate on bills not due, the net profits for the half-year ending June 30th last amount to 197,604*l.* 12s. 1d. This sum, added to 20,123*l.* 9s. 1d. the balance brought forward from last account, produces a total of 217,728*l.* 1s. 2d. The directors have declared an *interim* dividend for the half-year of ten per cent., which will absorb 200,000*l.* The balance-sheet will be found printed in our advertisement columns.

The Free Public Library at Richmond, Surrey, was re-opened on Tuesday last by H.R.H. the Princess Mary Adelaide, Duchess of Teck. The building, which has been closed for some time, has been enlarged to almost double its original capacity. The expense attaching to these alterations has been borne in a large measure by the inhabitants. The building, which is Gothic in character, is divided into separate reading-rooms, which are at present stocked with upwards of 12,000 books. The architect is Mr. F. J. Brewer, and the contractor was Mr. F. Sims.

The Royal Commission on Trade.—The final report of the Royal Commission appointed by the Conservative Government last year to inquire into the cause of the depression in trade has been prepared, and will be issued shortly. The Commissioners will announce that they do not find any evidence of depression in trade, so far as depression is taken to mean the restriction of trading operations. On the contrary, they find that the volume of British trade has continued to increase more than commensurately with the growth of the population, and that the general industrial condition of the country is satisfactory. Low prices and consequent diminution of profits are held by the Commissioners to constitute the only evidence of trade depression. The Commissioners will report that there has been an unusually prolonged period of over-production, due mainly to the vast increase of wealth in the country and the competition arising from a superabundance of capital. The Commissioners do not consider that commercial legislation or statutory interference with labour arrangements have injured British trade, and they do not recommend any increase in the hours of labour or a diminution of wages. Their report will be found to be distinctly favourable to the trade-unions of the country. The recent failure of agriculture is held by the Commissioners to be the main if not the sole cause of the diminution in the home trade, which is otherwise described as satisfactory, while the condition of the working-classes is reported as much improved during the past two decades.—*Morning Post* (August 4).

PRICES CURRENT OF MATERIALS.

TIMBER.	£.	s.	d.	£.	s.	d.
Greenheart, B.G. ....ton	6	5	0	7	0	0
Teak, E.I. ....load	11	0	0	15	0	0
Sequoia, U.S.....foot cube	0	2	4	0	2	9
Ash, Canada ....load	3	0	0	4	10	0
Birch ,, ...	2	10	0	4	0	0
Elm ,, ...	3	10	0	4	10	0
Fir, Dantsic, &c.	1	10	0	4	0	0
Oak ,, ...	2	10	0	5	0	0
Canada	4	0	0	6	10	0
Pine, Canada red	2	10	0	4	0	0
,, yellow	3	0	0	5	0	0
Lath, Dantsic ....fathom	3	10	0	5	0	0
St. Petersburg	4	0	0	6	0	0
Wainscot, Riga....log	2	15	0	4	10	0
,, Odessa, crown	3	7	6	0	0	0
Deals, Finland, 2nd and 1st...std. 100	7	0	0	8	0	0
,, 4th and 3rd	6	0	0	7	0	0
Riga	6	0	0	7	0	0
Deals, St. Petersburg, 1st yellow ...	8	0	0	14	0	0
,, 2nd ,, ...	7	0	0	8	0	0
,, white	7	0	0	10	0	0
Swedish	6	0	0	15	0	0
White Sea	7	0	0	17	10	0
Canada Pine, 1st	17	0	0	30	0	0
,, 2nd	12	0	0	17	0	0
,, 3rd, &c.	6	0	0	10	0	0
,, Spruce 1st	8	0	0	11	0	0
,, 3rd and 2nd	5	0	0	7	10	0
New Brunswick, &c.....	5	0	0	7	0	0
Battens, all kinds	4	0	0	12	0	0
Flooring Boards, sq. 1 in., Prepared, first	0	9	0	0	13	0
Second	0	7	6	0	8	6
Other qualities	0	5	0	0	7	0
Cedar, Cuba.....foot	0	0	3½	0	0	4
Honduras, &c.	0	0	2½	0	0	4
Australian	0	0	2	0	0	3
Mahogany, Cuba	0	0	5	0	0	7½
St. Domingo, cargo average	0	0	5	0	0	7½
Mexican ,, ...	0	0	3½	0	0	4½
Tobasco ,, ...	0	0	4	0	0	6½
Honduras ,, ...	0	0	4½	0	0	6½
Maple, Bird's-eye....	0	0	6	0	0	8
Rose, Rio .....ton	7	0	0	10	0	0
Bahia....	6	0	0	10	0	0
Box, Turkey	5	0	0	17	0	0
Satin, St. Domingo .....foot	0	0	7	0	0	11
Porto Rico	0	0	8	0	1	2
Walnut, Italian	0	0	4	0	0	5

METALS.	£.	s.	d.	£.	s.	d.
IRON—Pig, in Scotland .....ton	0	0	0	0	0	0
Bar, Welsh, in London.....	4	7	6	4	15	0
,, ,, in Wales	4	2	6	4	7	6
,, Staffordshire, London	5	10	0	6	0	0
Sheets, single, in London.....	6	15	0	8	10	0
Hoops ,, ...	6	0	0	7	0	0
Nail-rods ,, ...	5	10	0	6	10	0
COPPER—						
British, cake and ingot .....ton	41	10	0	42	10	0
Best selected	42	10	0	43	10	0
Sheets, strong.....	46	10	0	48	0	0
,, India	44	10	0	45	10	0
Australian	0	0	0	0	0	0
Chili, bars	38	15	0	39	2	6
YELLOW METAL.....lb.	0	0	3¾	0	0	4¼
LEAD—Pig, Spanish	12	12	6	12	15	0
English, common brands.....	13	0	0	0	0	0
Sheet, English	13	15	0	14	0	0
SPELTER—						
Silesian, special .....ton	14	2	6	0	0	0
Ordinary brands	13	17	6	14	0	0
TIN—						
Banca .....ton	0	0	0	0	0	0
Billiton	0	0	0	0	0	0
Straits	96	5	0	96	15	0
Australian	98	17	6	97	7	6
English ingots.....	101	0	0	102	0	0
ZINC—						
English sheet .....ton	18	0	0	18	5	0

OILS.						
Linseed .....ton	21	17	6	22	5	0
Cocoanut, Cochin	32	10	0	33	0	0
Ceylon	25	15	0	0	0	0
Copra.....	0	0	0	0	0	0
Palm, Lagos	23	10	0	0	0	0
Palm-nut Kernel	0	0	0	0	0	0
Rapeseed, English pale.....	22	5	0	0	0	0
,, brown	20	15	0	0	0	0
Cottonseed, refined	18	5	0	18	15	0
Tallow and Oleine	25	0	0	45	0	0
Lubricating, U.S.	6	0	0	10	0	0
,, Refined	8	0	0	13	0	0
TURPENTINE—						
American, in casks.....cwt.	1	5	6	0	0	0
TAR—Stockholm .....barrel	0	15	0	0	15	6
Archangel.....	0	10	6	0	11	0

CONTRACTS AND PUBLIC APPOINTMENTS.

Epitome of Advertisements in this Number.

CONTRACTS.

Nature of Work, or Materials.	By whom required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.	Page.
Laying Cast-Iron Water Mains.....	Tottenham Local Board	— De Pape	August 10th	ii.
Cast-Iron Water Pipes	Enfield Local Board ...	W. Kitteringham.....	August 11th	xiii.
Erection of Guard Room, Store, &c.	Admiralty	*Official*	August 13th	i.
Glazed and Cast-Iron Pipe Sewers	Maldon U. R. S. A. ...	A. Stewart.....	August 16th	ii.
Street Improvements	Southend Local Board	F. H. Tulloch	August 17th	ii.
Painting Works, Eastern Hospital	Met. Asylums Board...	T. & W. Stone	August 18th	ii.
Pipe Sewers	Uxbridge R. S. A.	J. Anstie.....	August 20th	xiii.
Laying and Jointing Pipes.....	Northwich Local Board	H. Bancroft	August 21st	ii.
Road Materials	Rochester Corporation	*Official*	August 24th	ii.
Balancing Reservoirs, Filters, &c.	Cardiff Cor. Water Wks	J. A. B. Williams	August 26th	ii.
Broken Guernsey Granite	Gravesend U. S. A.....	*Official*	Sept. 2nd	ii.
Enlargement of Schools	Leyton School Board...	J. T. Newman	Sept. 6th	ii.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in.	Page.
Clerk of Works	Clerk of Peace, Salop ...	2*l.* 10s. per week ...	August 6th	xvi.
Assistant Surveyor.....	Civil Service Com.	Not stated	Sept. 21st	xvi.

TENDERS.

ABRIDGE (Essex).—For alterations and repairs to the White Hart public-house, Abridge, Essex, for Messrs. Charrington & Co. Mr. John Hudson, architect, Leman-street:—

J. & H. Cocks, Mile End £1,359	0 0
J. Bentley, Waltham Abbey 1,290	0 0
R. Walter, Barking..... 1,050	0 0
J. S. Hammond & Son, Romford ... 968	0 0
G. Ransom, Walworth 835	0 0
W. Gladding, Whitechapel* 779	0 0

* Accepted.

BARNSBURY.—For alterations and additions in Offord-yard, Barnsbury, for Messrs. Weeden & Co. Mr. John House, architect:—

Chant £435	0 0
McFarlan Bros..... 429	0 0

BRIGHTON.—For the erection of a building for the reception of eight indigent ladies, for Mrs. J. H. Macdonald. Messrs. Lainson & Son, architects:—

W. A. & B. Field £4,964	0 0
G. R. Lockyer..... 4,740	0 0
J. Barnes 4,670	0 0
G. Howard..... 4,389	0 0
G. Cheesman & Co. (accepted) 4,270	0 0

CAMBERWELL.—For the erection of spire and gallery, and for alterations, at the Presbyterian Church, Camberwell. Mr. S. C. Capes, architect. Quantities not supplied:—

Mackie.....£1,017	0 0
Kynoch 957	0 0
Downs 835	0 0
Smith 819	0 0
Goad..... 793	0 0
Roberts 712	0 0

BARNET.—For the erection of the Barnet Workhouse Infirmary. Mr. John Ladds, architect, Chapel-street, Bedford-row, W.C. Quantities by Mr. Thos. Ladds:—

		Warming.
Williamson, Finsbury Park	£7,474	£150 0
A. Taylor & Co., Cambridge-road, E.	6,776	200 0
W. James, High Barnet, N.....	6,127	160 0
Priestley & Gurney, Hammersmith	5,990	160 0
Charles Cave & Son, New Barnet	5,897	165 0
Lobb & Olver, New Southgate...	5,814	165 0
Brooks & Meeder, Enfield.....	5,751	180 0
Patman & Fotheringham, Theobald's-road	5,573	150 0
T. L. Green, Eagle-street, Holborn, W.C.	5,543	157 0
Pack Bros., Brixton-road	5,533	180 0
T. Turner, Watford	5,520	165 0
Staines & Son, Great Eastern-street	5,483	155 0
Stephens, Bastow, & Co., Wandsworth	5,477	150 0
E. C. Howells & Sons, Lambeth.	5,394	150 0
John Glasscock & Son, Bishop's Stortford	5,387	160 0
Charles Wall, Chelsea.....	5,357	150 0
W. Oldrey, Westbourne Park ...	5,336	157 10
Gould & Brand, Camden Town...	5,335	165 0
J. Garlick, West Brompton	5,230	165 0
Wall Bros., Kentish-town	5,219	150 0
G. Parker, Peckham	5,170	160 0
Foster & Dicksee, Rugby	5,168	150 0
G. Worboys, Bassingbourn, near Royston	5,140	150 0
Kirk & Randall, Woolwich	5,120	165 0
Albert Kimberley, Banbury	5,087	153 15
James Smith & Sons, South Norwood.....	5,070	150 0
J. Curnow, High Barnet.....	5,013	150 0
Marriott Bros., High Barnet.....	4,950	160 0
J. Church & Co., Coleman-street, City	4,625	150 0
John Wilmott & Sons, Hitchin...	4,599	150 0
Charles Reed, Leytonstone	4,096	170 0

CAMBERWELL.—For bar-fittings for new tavern, Bramcote-road. Mr. Geo. Treacher, architect, Carterdane :—

Bright	£475	0	0
Hills	470	0	0
Turtle & Appleton (accepted)	445	0	0
Drew & Cadman	440	0	0

CROYDON.—For pulling down three cottages and erection of stables and warehouse, &c., in Handcross-alley, Church-street, Croydon, for Messrs. J. Thrift & Son. Mr. R. Ridge, architect, Croydon :—

Wyatt & Co., South Norwood	£263	0	0
Smith & Bullard, Croydon	259	0	0
A. Bullock, Croydon	251	0	0
D. Wallar, Croydon	249	0	0
S. Page, Croydon (accepted)	224	0	0

HAMMERSMITH.—For making up and paving roads, for the Vestry of Hammersmith :—

Aiminger-road.

G. Alldred	£539	0	0
Nowell & Robson	538	0	0
Mears & Co.	507	0	0
Tomes & Wimpey	499	0	0
J. Carter	469	0	0
W. C. Coat	446	0	0

[Surveyor's estimate, 576*l.*]

Binden-road.

H. Fortescue	555	0	0
Mears & Co.	531	0	0
Nowell & Robson	529	0	0
J. Carter	525	0	0
W. C. Coat	464	0	0
Tomes & Wimpey	413	0	0

[Surveyor's estimate, 576*l.*]

Ellingham-road.

J. Carter	385	0	0
Tomes & Wimpey	363	0	0
Mears & Co.	363	0	0
Nowell & Robson	352	0	0
W. C. Coat	314	0	0

[Surveyor's estimate, 343*l.*]

Ethelden-road.

G. Alldred	299	0	0
Tomes & Wimpey	291	0	0
Mears & Co.	289	0	0
Nowell & Robson	286	0	0
J. Carter	261	0	0
W. C. Coat	253	0	0

[Surveyor's estimate, 3 *5l.*]

Ingersoll-road.

Nowell & Robson	484	0	0
G. Alldred	467	0	0
Tomes & Wimpey	425	0	0
Mears & Co.	421	0	0
J. Carter	393	0	0
W. C. Coat	381	0	0

[Surveyor's estimate, 481*l.*]

HASTINGS.—For new shop-fittings for Mr. Lyons, Mentone Mansions. Mr. Ward, architect, Bank-buildings :—

Sage	£578	0	0
Drew & Cadman	525	0	0
Vigors, Hastings (accepted)	497	0	0

HOXTON.—For partially pulling down and re-building premises in Boot-street, Hoxton. Mr. R. A. Lewcock, architect, Bishopsgate-street Within :—

Goodall	£1,026	0	0
Shurmur	1,017	0	0
Anley	1,010	0	0
Nicholls	950	0	0
Jackson & Todd	919	0	0
Steel	915	0	0
Spencer & Co.	900	0	0
Kelvie	759	0	0
Ivory	756	0	0

ISLINGTON.—For shop-fittings for Mr. Roberts, 219½, Upper-street, Islington. Mr. J. Kingwell-Cole, architect, Mount-street, W. :—

Wall Bros.	£478	0	0
Sage & Co.	410	0	0
Drew & Cadman	370	0	0

LEYTONSTONE.—For decorative repairs at The Elms, High-road, Leytonstone. Mr. R. A. Lewcock, architect, Bishopsgate-street Within :—

Mansell	£200	0	0
Cain	175	0	0
Searls	175	0	0
Nicholls	145	0	0
Kelvie	141	0	0
Dainton	100	0	0

LIMEHOUSE.—For painting and decorating the Townhall, Limehouse, for the Churchwardens and Overseers. Mr. James F. Wesley, architect, Forest-gate :—

E. Lovett	£732	0	0
B. E. Read, Limehouse	715	0	0
M. A. Palmer & Co.	649	0	0
W. Read, Brixton	597	0	0
Jno. Walker	497	0	0
A. W. Derby	449	0	0

LONDON.—For alterations and repairs for the Royal Maternity Society, 31, Finsbury-square. Messrs. J. Reddall & Son, architects :—

Kilby & Gayford	£457	0	0
Heeps	447	0	0
King & Son	423	0	0
Woodward	345	0	0

LONDON.—For constructing vaults, &c., for new ale-stores, Brady-street, Whitechapel, for Messrs. Mann, Crossman, & Paulin. Mr. R. Spence, architect :—

Colls & Sons	£8,390	0	0
F. & J. Wood	8,383	0	0
S. Page	8,220	0	0
Harris & Wardrop	7,884	0	0
J. Morter	7,439	0	0
J. Mowlem & Co. (accepted)	7,188	0	0

LONDON.—For re-building No. 219, Brompton-road, for Miss Jeffreys. Mr. Robert J. Worley, architect. Quantities by Mr. R. C. Gleed :—

Perry & Co.	£3,800	0	0
Peto Bros.	3,790	0	0
Chappell	3,750	0	0
Lawrance & Sons	3,647	0	0
Toms	3,613	0	0
Croaker	3,573	0	0
Lucas & Sons	3,424	0	0
G. & J. Green	3,125	0	0

PADDINGTON.—For alterations to the Shakspeare Tavern, 65, Westbourne-grove, for Mr. A. T. Yardley. Messrs. A. W. Saville and W. J. Martin, joint-architects, Strand. Quantities supplied :—

R. Smith	£588	14	0
Jackson & Todd	497	0	0
Ward & Lamble	473	0	0
Burch & Co.	439	0	0
Spencer & Co.	430	0	0
B. Cook (accepted)	418	0	0

SHADWELL.—For the erection of new offices, corner of Garth-street and Gould's-hill, Shadwell, for Messrs. Hewett & Co., Limited. Mr. Chas. Dunch, architect. Quantities by Mr. Jas. F. Wesley, Forest-gate :—

Ashby Bros.	£2,299	0	0
Ashby & Horner	2,290	0	0
Colls & Son	2,250	0	0
Mowlem & Co.	2,176	0	0
J. Morter	2,165	0	0
T. Boyce	2,160	0	0
W. Shurmur	2,124	0	0
Grover & Son	1,969	0	0
Nightingale	1,930	0	0
Harris & Wardrop	1,885	0	0
J. & J. Greenwood	1,799	0	0

TURNHAM GREEN.—For alterations to two shops, Nos. 8 and 9, Queen's-terrace, Turnham-green, for Mr. Stratton :—

Adamson	£105	0	0
W. Horne (accepted)	91	0	0
Wilson	75	1	0

WOOLWICH.—For alterations and additions to the Prince Albert public-house, Hare-street, Woolwich, for Messrs. E. J. Rose & Co. Messrs. Wilson, Son, & Aldwinckle, architects, East India-avenue :—

Jackson & Todd	£980	0	0
John Warne	965	0	0
Palmer & Sons	898	0	0
Kirk & Randall	890	0	0
J. & H. Mills	870	0	0
Drew & Cadman (accepted)	750	0	0

WORTHING.—For the erection of a school-house and residence for the Rev. P. Crick. Messrs. J. E. K. & J. P. Cutts, architects, Southampton-street, Strand :—

J. W. Hobbs & Co., Limited	£5,060	0	0
R. C. Blaker	4,953	0	0
E. Snewin & Son	4,851	0	0
W. W. Smith	4,456	0	0

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M. O. T.—W. G. S. (thanks).—A. B. (shall be glad to see the drawings).—W. S.—S. H. T.—H. S.—H. B.—W. T.—B. & H.—G. T.—B. & W.—J. W. P. (a plan for carrying out that idea has already been published in our columns).—F. M. C.—J. W. M.—A. E. P. (shall have consideration).—E. J. T.—J. H. (no space this week).

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